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LIGHT ⁘ HEAT ⁘ POWER ⁘ BYE-PRODUCTS

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EDITORIAL NOTES.

The Honour.

WITH such extraordinary unanimity as was expressed by presence, act, and voice at the dinner to Sir David Milne-Watson, LL.D., D.L., at the Savoy Hotel on Tuesday evening of last week, it can be said, without fear of contradiction, that the objects of the occasion were completely endorsed by the entire gas industry. Representation was distributed over the whole of the governing bodies of the national organizations of the industry—the British Commercial Gas Association, the Federation of Gas Employers, the Gas Companies' Protection Association, the Institution of Gas Engineers, the National Gas Council, and the Society of British Gas Industries. No matter with whom the inception of the function originated, it was taken up with a spontaneity which made the duties of the Organizing Committee and their genial Hon. Secretary (Mr. W. E. Price) one of ease, with the sole exception that there had to be a line drawn to the invitations, so that numbers should not make the event unwieldy. But all understood, and bowed to the inevitable—knowing that those absent would be well-represented. Many have passed away who knew of the work of Sir David for the industry; but their day and their great labour had its presence in the welcome person of Mr. Henry Woodall, Senior.

There they were—administrative, engineering, secretarial, commercial, and manufacturing interests—assembled, unsectionized and in thorough unity, with a double purpose. This was faithfully voiced in the eloquent speech of the Chairman (Prof. Arthur Smithells, C.M.G., F.R.S., D.Sc.), when he said: "We are assembled to give evi-"dence to Sir David of how much we rejoice in the event "[his knighthood], and to take a welcome opportunity "to give expression to the esteem in which he is held "among us." There is a proneness as days come and go, as fresh things emerge from the surface of our daily activities, as they become enlarged, are dealt with, and pass into the accumulation of work which is essential to progress or to defence, for us to take them merely as things normal. But in an industry such as that of gas supply, they are more than that. With proper tending, they result in something beneficial; without it, they may grow into something detrimental. Looking back twenty years, there was then no proper representative central organization in the industry, except on the technical side. Since then, in the formation and development of central co-operative organization, Sir David has taken a leading part; and in it he has been not a figurehead, but, in divers ways, the hardest worker of all. And there was no real call upon him to do it, other than that of a genuine belief that unity is strength, co-operation a needed service, and position imposing a duty to be performed honourably and unselfishly. The central organizations of the gas industry have become powerful; their work is so interlaced that, through them and their operations, the industry itself has become more powerful and effective, and has attained a higher place in the country and its service than it could possibly have done had its constituents continued as floating units. Without their work, and without a broad-minded, diplomatic, and active counsellor and worker in the capital seat, the affairs of the industry, in the critical times through which it has passed, would have been seriously prejudiced, perhaps gravely damaged.

Indisputably, a great factor in the central organizations has been the Gas Light and Coke Company. It has stood, so to speak, at the head; and its vast resources and influence have been thrown into the common pool, and used for the common good. To call "representative" or "central" any organization in the gas industry without that Company would be unthinkable; no one would be prepared to accept an organization as being representative of the industry as a whole without the Company as a constituent. This is generally recognized; but there has never been any claim on the part of the Company to be anything more than a unit. If its magnitude, and the obligations that come from magnitude, look imposing, the Company cannot help it, any more than an abnormally big man can help being conspicuous in a crowd of normally sized persons. It was Mr. Frank Jones who asked, What has the gas industry gained from its association in organized state with the Gas Light and Coke Company? What has the Gas Light and Coke Company gained from association with the central organization? To the latter question, Mr. Jones replied: "I suppose only the sort "of feeling a big brother experiences when he has done "a kindly action for a smaller brother." We are afraid the supposition and simile are a little wide of the true view. The influence of the Company is unquestionably great; that influence has been given unstintingly to the general cause. But Sir David and his directorial colleagues are fully conscious of the enormous difference there is in an organization being representative of an industry, and a single Company, however large, being representative of only itself. There is all the difference in the world in dealing with a matter of universal importance on a universal basis, and dealing with it piecemeal in its application to a single unit. Thus it is that Sir David would be the last to say that, in doing its part in the work of the central organizations, his Company has not gained anything which it could not have gained single-handed. In that may be found a reason why latterly he has been urging the need for the strengthening of the weaker places in our industrial system, for weakness anywhere must be detrimental in many seen and in many unseen ways to the whole.

There is no need to review in detail the work that has been done during the time that Sir David has been the chief collaborator in the work of the National Gas Council and of other organizations. We have been freed from much undergrowth which impeded the way to faster progress; greater liberty has been secured; there has been revision of powers, and the work in this regard is going on to the general advantage; a solid front has been presented in defensive operations, and in facing anxious and critical days; and appeal to consideration has succeeded on the basis of universal request and representation. But for the President it has not been all honey and harmony. Nevertheless, Prof. Smithells was able to say: "I have "seen Sir David in days of great anxiety. I have seen "him confront problems of the greatest difficulty. I "have never seen him waver, and I have never seen him "fail." We would add—he has never sought to compose a difficulty by taking the line of least resistance, if that was not the proper line. He has gone to the root of the matter, and has endeavoured to apply the remedy there, so that there should not be a repetition of the trouble. There has been nothing superficial about his work; wher-

ever required it has always been fundamental. Personal ability, courtesy, and willing co-operation are also recognized in the quarter where the industry makes contact with the Government of the country, as was testified by Mr. Percy Ashley, C.B., of the Board of Trade. All this is the evidence of the strength and qualification of a man and a leader; and there was no hesitation on the part of anyone at the dinner in speaking of it.

Hence it was that Prof. Smithells was on the occasion merely voicing the general feeling when he said: "We "rejoice to honour Sir David to-night. We recognize "in him a leader undaunted by difficulties, and unspoiled "by success." And there was common and hearty corroboration of the wish that he might have long life to enjoy the honour bestowed upon him, and that he might have health and strength, and be long willing, to carry on the excellent work for which he has shown such marked aptitude. But Sir David has no desire, willing as he is to work, that there should be any feeling that his is a one-man job. Though so fitly equipped, his greatest strength is in the collaboration of all, for central and representative organization can be of little avail unless every undertaking recognizes its individual responsibility, and performs its part. If this is done, then the industry can face the future with equanimity. Most cordially we add our endorsement to all that was said at the dinner of work well and nobly accomplished.

The Presidential Token.

It has become the fashion with some technical organizations to present to the retiring President a token which commemorates his term of office, and is (when worn on festive or other high occasions) a symbol of his having enjoyed the highest honour his fellow members can bestow. The Manchester Institution of Gas Engineers have followed the lead of others by introducing a presidential emblem, for the design of which Mr. J. Bridge, of Elland, has been largely responsible. It was the privilege of the President (Mr. C. S. Shapley) to make the presentations to all the Past-Presidents who were able to attend the recent annual meeting [p. 588]. It made quite a feature of the proceedings; for the Manchester Institution can boast of twenty-five living Past-Presidents—at the time the medals were struck, there were twenty-six, but Mr. H. Kendrick has since passed away. But no less than nineteen Past-Presidents were there to receive the handsome gifts; and right heartily were they individually received by the members, in chronological order of Presidency, with at the head Mr. T. Banbury Ball, who "reigned" in 1898. All the recipients feel the great honour that is expressed by the act, which brought to memory the esteem and regard in which they were held by their professional fellows at the time they were elected to the chair, and which the emblem to-day confirms. There is in such gifts a value which cannot be priced; and it is because of this that men are proud to receive such tokens from their fellows.

Chemistry on Small Gas-Works.

In the gas industry, large sums of money are spent on plant, materials, and labour; but among the managements of many of the small works, making up to (say) 200 million c.ft. per annum, considerable indecision exists as to whether that expenditure should be supplemented by having a chemist on the staff to keep thorough supervision over, and so improve and maintain, the efficiency of plant operation, ensure that the materials purchased are of the quality bargained for, that qualities of products are at the right standard, and that proper prices are secured for certain of the secondary products. The problem of small works in this regard was raised at the annual meeting of the Manchester Institution of Gas Engineers [p. 589]. Of course, it is hoped that the modern system of training technical officials for the gas industry will in time give to the smaller works men whose qualifications include chemistry, though it is true the chief engineer and manager has on most works already sufficient to occupy his time without having to carry out routine testing. But knowledge of what should be done, and the capability of directing the work, will be a great advantage. However, there is the present to be considered; and the present is big with growing responsibilities. Comment was made by Mr. J. H. Brearley upon the inadequacy of chemical supervision on small works; and he submitted two suggestions for consideration. One was whether some co-operative system of chemical control could not be arranged by groups of works; and the other, whether it would not pay the gas industry to organize a scheme of periodical inspection of such works. Regarding the first point, we are rather inclined to favour the view of Mr. W. M. Carr that a works of 100 million c.ft. output ought to be able to afford—in fact, must afford—a chemist of its own. This was the view of the President; and Mr. J. Bridge, of Elland, bore testimony to the value of having chemical control on his works, with their make of a little over 150 million c.ft. Some years ago, the point was impressed upon us, when a small works introduced a laboratory and an assistant, and the manager was satisfied that, directly traceable to this, in the first year there were economies and improved income from certain of the bye-products equal to upwards of £600. This was not bad for a start. Concerning the second point made by Mr. Brearley, though we fully agree that it is important to the industry generally that the smaller undertakings should be worked at the highest attainable efficiency, we think it hardly likely that a scheme of systematic inspection could be paid for out of the funds of the industry generally. There would be no excuse for this; for if greater efficiency and economy result, then the works itself could afford to bear its own expenses for realizing the improvement. The discussion on the point is well worth reading, as are also the remarks of Mr. Shapley on the question of the probable price at which competition will in future be offered by electricity. The discussion urges a looking-forward policy, which prudence suggests should be applied as promptly as possible.

Scientific Investigation of Coke.

Never has coke had so much scientific investigation expended upon it as it is receiving at the present day. There was a time—and not so long ago—when at our command there was not a tithe of what is now known regarding the requirements, and the behaviour, of coke in different circumstances of use. The work that is being done at the Leeds University, at the Fuel Research Station, at other centres, and by private enterprise was well reflected at the joint meeting of the Yorkshire Section and the Fuel Section of the Society of Chemical Industry. The first part of the report of the proceedings was published in the "Journal" last week, and the report is concluded in this issue.

It is some time since our workers arrived at definite conclusions regarding the importance of size, ash content, fusibility of ash, and moisture content in relation to the efficiency of coke in use for different purposes. But as Mr. H. Hollings, M.Sc., and Mr. N. E. Siderfin, M.Sc., of the Gas Light and Coke Company's Laboratories, said in their paper, there are other factors the significance of which it is less easy to elucidate; and it is a great satisfaction to the producers of coke to know that science is doing a great deal to that end. There is, for instance, the question of the reactivity of coke. It is important that we should get more intimately acquainted with this part of the subject, because the knowledge will enable us to work for improvement, within the region of practicability, to obtain those characteristics which will (we hope) make coke sought after, instead of our having to seek custom for it. The knowledge may also assist in developing the value yielded by our carbonization processes. It is true we are up against this fact—that to secure the highest working efficiencies in different utilizations of coke, different physical characteristics are necessary; and we shall have to ask science to do what it can to advise upon the means of realizing a product which will offer the best all-round service for the varied purposes to which it is put. For example, in the water-gas process the coke that is the least reactive towards carbon dioxide is the best suited for the blow period; while a highly reactive coke is the most efficient for steam decomposition during the

run period. This is a little awkward; and there must be some give and take on the part of the water-gas process, in order that practicability may have a voice in the control. Then in the gas producer, the most suitable fuel is clearly one which reacts most readily with carbon dioxide. In the open grate, it is also advantageous to use a highly reactive fuel; while in closed stoves and small boilers, unless provision is made for the admission of secondary air, a highly reactive coke is not desirable, in so far as heat is lost due to the reduction of carbon dioxide to carbon monoxide. Nevertheless, though different utilizations for highest efficiencies require different degrees of reactivity, the research accumulation is valuable, because it plants knowledge where ignorance existed before, and it is directive.

The production of coke of high or low reactivity is an interesting phase of the question. Regarding it Messrs. Hollings and Siderfin provide much light for those who are, and many who should be, concerned in the subject. Carbonization of even the same coal under different conditions will affect the reactivity of the coke. It is, however, seen how, by the use of a blend of (say) Durham coking coal and South Yorkshire non-coking coal, or coal briquettes, in carbonization, a higher reactivity can be secured—in fact, by a proper selection of the blend of coal, one may very materially influence the reactivity of the product, and yet, with suitable carbonization conditions, ensure the advantages of a hard coke which suffers less in breakage, and therefore, having been once graded for a particular purpose, will continue at the desired size. It is pointed out that the factors in relation to coke which are most governed by the choice of carbonizing plant are density, hardness, porosity, and reactivity; but, as already indicated, the coal used and the method of operation are also important. It needs stressing in the gas industry, in order to enforce the truth upon those technical men who are of present opinion that a great deal too much fuss is being made over this question of coke qualities and merits, that it is necessary to be open-eyed in this matter in these days. For instance, it is not only the scientific investigators within the gas industry who know that, if a coke can be made which combines the desirable qualities of high weight per unit volume, hardness, ease of ignition, and high combustibility, then that is the fuel for closed stoves and water heaters; and—mark this—such a coke can be made in coke-ovens from blended or briquetted coals. This fact is worth pondering over; there should be inducement in it for exciting a more general interest in coke by the technical men of the gas industry.

In the paper by Messrs. Hollings and Siderfin the differences in coke characteristics required for various uses, and the reasons, are discussed. In this connection, the point is brought out in the paper by Miss Margaret F. Bligh and Mr. H. J. Hodsman, M.Sc., that, if it is desired to produce coke giving a high radiant efficiency, the aim should be to have a low content of ash and volatile matter. Of course, the presence of volatile matter is conducive to rapid combustion and free burning properties; and, on this ground, a low-temperature coke has advantages. But these qualities appear to be obtained only at the expense of radiant efficiency. It is obvious that if, through the presence of volatile matter, a flame is produced above the fuel, the proportion of heat radiated will be reduced. Prof. Cobb commented on this in relation to a statement by Messrs. Hollings and Siderfin, to the effect that in the open grate it is advantageous to use a highly reactive fuel, so that there should be maximum flame production due to the combustion of carbon monoxide above the fuel. He believes that Mr. Hodsman has brought forward for the first time the point that combustion above the fuel lowers the radiant efficiency of the fuel itself. The farther scientific exploration of coke is carried, the worse becomes the case for low-temperature coke.

In connection with the water-gas process, Messrs. Hollings and Siderfin examine a report compiled by the Carbonization Committee of the American Gas Association; and they deduce from the work that, at approximately equal air velocities, there is less loss of heat in the blow gases when using coke-oven or horizontal retort coke, than when employing vertical retort coke. This is mostly due to the lower reactivity of the harder coke resulting in the formation of less carbon monoxide. Also, with any given coke, there is less loss of heat in the blow gases when the air velocity is high. Herein lies one of the explanations of the known high efficiencies when using high blast pressures on water-gas generators. It is concluded that the coke which is most reactive towards steam is not necessarily the most suitable for water-gas manufacture. A non-reactive coke is desirable for thermal efficiency during the air blow, because endothermic reaction is minimized. At the same time, a low apparent specific gravity is desirable, because the open structure permits of ready heat interchange between the coke and the gases passing through it. Furthermore, with a non-reactive coke there is necessarily a more uniform distribution of heat in the fuel bed.

The papers read at the Leeds conference are rich in practical suggestion; and they mark distinct progress in our knowledge of the essentials in coke for work of varying character.

On the Therm Basis.

THE useful compilation made annually by the National Gas Council of the applications for Orders under section 1 of the Gas Regulation Act is again to hand; and it refers to the position of affairs at Dec. 31 last. The statement includes maximum or standard prices per therm, present declared calorific values, and notification of any changes from the original declared values. We calculate that, in all, 579 undertakings are dealt with, which is 202 below the number of undertakings (781) in the Board of Trade Returns for 1925. However, the figures show that 74 p.ct. of the statutory undertakings of England and Wales, Scotland, and Northern Ireland are now under the therm system; but any enterprising member of the National Gas Council could, by the expenditure of much time, with the Council's compilation, aided by the volumetric figures as to gas sales in the Board of Trade Returns, find that the 74 p.ct. based on number of undertakings would be considerably exceeded by a percentage based on gas sales. The declared calorific values in the returns range between 200 B.Th.U. and 600 B.Th.U. gross per c.ft.—Nuneaton being at the one extreme and Lampeter at the other, both showing a strange defiance of the considered opinion and deliberate practice of the bulk of the others.

Examining the detailed figures as to declarations, it is found that the zone of greatest popularity, and therefore, we take it, in present circumstances the zone of greatest usefulness, is between 450 and 500 B.Th.U., included in which we have no less than 485 of the 579 concerns dealt with, or 83·76 p.ct. The most favoured declaration is 500 B.Th.U., by 187 undertakings; but 450 B.Th.U. maintains a strong second place, with 137 concerns. The third position is occupied by 475 B.Th.U., with 64 undertakings. The catholic spirit of the Act is seen by the fact that below 450 B.Th.U., and running down to 200 B.Th.U., we have 69 declarations; and above 500 B.Th.U., and running up to 600 B.Th.U., we have 25. The declarations are all included in 25 different calorific values, as follows: 200 B.Th.U., 1; 320, 1; 400, 12; 410, 2; 420, 6; 425, 34; 430, 6; 440, 7; 450, 137; 460, 28; 465, 1; 470, 25; 475, 64; 480, 41; 490, 2; 500, 187; 510, 3; 520, 4; 525, 4; 530, 2; 540, 4; 550, 5; 560, 2; 600, 1. The figures show that the liberty to declare any value, with the charges to consumers based on the therm, is valuable, and provides an open way to economy according to local circumstances.

Making a rough cast, 87 changes have been effected from the original declared values, of which 65 have been upwards and 22 downwards. Three or four of these are in districts where varying declared values obtained; and they have been levelled to either the lowest figure, a mean one, or the one represented by the largest sales in the area. For example, there is a case where 425, 475, and 500 were the calorific values in various parts of the area; and these have been levelled to 450. To the same figure has been brought the gas supply in an area where 430, 450, and 550 were the uneconomical variations. Comparing the increases and the reductions, it is seen how the conditional liberty to declare can be made to fit the circumstances of plant, the supplies of gas-making material, or the requirements of the locality. There are movements in some cases

which are exactly reversed in others. Here are representative changes which have been made since the original declarations: Upwards: 360-450, 375-425, 400-425, 420-450, 425-450, 425-460, 425-475, 430-475, 450-460, 450-470, 450-475, 450-480, 450-500, 460-470, 460-475, 460-500, 460-525, 470-500, 475-500, 480-500, 500-525, 500-540, 550-560. Downwards: 280-200, 425-400, 450-420, 475-425, 475-450, 490-450, 500-450, 500-460, 500-470, 500-475, 500-480, 520-480, 530-500, 540-520, 550-500, 550-520. This compilation of the National Gas Council is highly informative, and supplies interesting study.

Ideal Homes.

It would have been excusable to think it impossible for an Ideal Home Exhibition to surpass in interest those that have preceded the one which is now running at Olympia. But it does so. It shows advances in every direction, and gas makes good contribution. Some people give a very narrow meaning to the term "ideal." A home is made up of many essential parts; nevertheless, it is frequently found that people regard the term "ideal" as being limited to, or simply synonymous with, "picturesque." The ideal home, however, is one in which there is a combination of things artistic and good to look upon, and those which are utilitarian, and serve to lighten labour, and promote cleanliness, economy, and efficiency. The many items which compose the ideal home can be studied at Olympia; but discrimination is required by visitors, for some of the things which are shown, while they may be utilitarian, are not so reliable, economical, and efficient as other goods which perform similar work. This is where the public may be led astray by attendants at stands, who are not by any means all of the George Washington type, and are not so frank in some matters as their knowledge would enable them to be were they not fettered by a particular mission. However, at the Exhibition this year, gas makes an excellent display. Its competitor has not a combined exhibit on this occasion, though several firms are displaying electrical goods. The joint exhibit of the London Gas Companies, the work that has been done by the South Metropolitan Company in two excellent examples of modern houses, and the displays by individual firms of their productions, give typical demonstration of what gas can do for the homes of the people, whatever their social position or the depth of their purses. With gas appliances, size and finish have a large part in making differences in price; but the great attention that is paid to-day by manufacturers to economy and to thermal and operating efficiencies in all classes of appliances, has resulted in all homes, without distinction, being able to enjoy the services of gas—services which promote household economy, convenience, cleanliness, efficiency, and reduce labour by eliminating those elements in domestic service which contribute to it. There is at the Exhibition a very fine illustration of the fact that though gas itself is old in years, the methods of application are in keeping with the day and requirements. Those methods are founded not only on the experiences of years, but on research, which has produced an ever-widening range of utility, while raising the attributes of economy and efficiency. Thus in the real ideal home gas is claiming and obtaining a larger and larger place; and this is the reason for the year-by-year growth of gas consumption.

Gas Legislation.

Little has recently been heard of this matter from official sources; but the minutes of the Central Executive Board of the National Gas Council show that the subject was again under consideration at their meeting on Tuesday of last week. The subjects to be dealt with are so highly important that it is necessary to examine them most carefully in every detail, in order to present to the Board of Trade a draft as complete as possible.

Co-operative Tar Scheme.

Lancashire has fallen into line with a co-operative tar scheme—at least, the gas undertakings of that county represented in the Commercial Section of the Manchester Institution have done so. Reference was made to the matter by Mr. E. H. Hudson at the recent annual meeting. Coming from Yorkshire, and that county having launched their scheme last October, he warned the Lancashire Section that they had entered upon an intricate piece of work, which would demand the expenditure of much consideration and time. But his belief is that whatever time and consideration are devoted to the scheme will bring its reward. He indicates that, in the case of Yorkshire, they will be gratified with the results, although they have no precise knowledge as to what the ascertainment will be at the end of the accounting period. Mr. Hudson feels they are, through the scheme, working for the common good; and he acclaims it as "the best system" of selling tar which has come before the industry in his time.

Coal Delivery Delays.

It will be seen from the minutes of the Central Executive Board of the National Gas Council (as printed in another column) that there has been bitter complaint on the part of some gas undertakings in the Eastern Counties over the delays which have occurred in the delivery of coal to them. In the House of Commons on Tuesday of last week, Mr. Reginald Clarry called the attention of the Minister of Transport to the matter. The Eastern Counties undertakings are served by the Great Eastern Section of the L.N.E.R.; and through the shortage of coal deliveries, Mr. Clarry asserted, gas supplies are being jeopardized. He inquired of the Minister what steps it was proposed to take to assist these public utility concerns. The information given by Lt.-Col. Ashley was not very reassuring. He has been in communication with the Railway Company, and, as a result, was informed that supplies are now being maintained. He, however, admitted that the position was still unsatisfactory, though there had been some improvement.

Protective Clause.

In last week's "Electricity Supply Memoranda," reference was made to the contest that is proceeding on behalf of gas undertakings for protection as ratepayers in Bills and Special Orders referring to municipal trading in electricity. This protection is more urgent now than it ever was, in view of the possible considerable commitments of some local authorities in connection with assisted wiring and hiring and selling powers. It was the case of Bridport which received consideration last week; now the minutes of the Central Executive Board of the National Gas Council state that a petition is being lodged in the House of Lords, on behalf of the Hastings and St. Leonards Gas Company, for the insertion of the Northumberland clause in the Hastings Corporation Electricity (Extension) Order.

A Colliery Combine and the Price of Coal.

Large buyers of coal are speculating over the question whether a combination of colliery interests will bring about a reduction in price. The first amalgamation which has taken place under the Mining Industry Act of last year is that of the Denaby and Cadeby Main Collieries, Ltd., the Dinnington Main Coal Company, Ltd., the Rossington Main Colliery Company, Ltd., and the Maltby Main Colliery Company, Ltd., with a capital of £5,000,000. Lord Aberconway is the Chairman of the amalgamation, which is known as the Yorkshire Amalgamated Collieries, Ltd. In an interview on the subject (published in the "Daily Telegraph" for the 10th inst.), his Lordship stated that people, including the railway and gas companies, are not now laying down stocks of coal; the reason being that they are hoping the price will come down. This, he says, is impossible until the collieries are working full time, so that the overhead charges are brought down per unit of output. In an earlier part of the interview, there appears this significant remark: "Now instead of having four different selling agencies in competition, which means lowering the price, we sell through one office, and we get a better price and better market."

Mains and Cables in Highways.

The Conjoint Conference of Public Utility Associations are proposing to take a very proper step in the endeavour to reach a settlement with regard to a protective clause in relation

to the laying of mains and cables in highways. They have appointed a small Committee to meet representatives of the Railway Association and the Canal Association, with a view to attempting to agree to a standard protective clause for insertion in future Bills and Orders. If this can be accomplished, it will save much fighting, and incidentally some feeling.

Non-Political Miners' Unions.

Recent references have been made in the "JOURNAL" to the formation of non-political unions for miners in Nottinghamshire, Durham, South Wales, and elsewhere. The initial steps for the formation in Yorkshire of a similar Union have been taken; and Mr. George Spencer, M.P., is advising regarding the constructive stage. To dissatisfaction with the leadership of the Miners' Federation and to the way the funds have been spent is attributed the movement in what was the stronghold of Mr. Herbert Smith.

PERSONAL.

The Bradford Corporation Gas Committee have registered the following minute: "Resolved that the Committee hereby place on record their very sincere regret that Mr. CHARLES WOOD'S (recently resigned City Gas Engineer and General Manager) health has compelled him to retire from a position he has held with outstanding credit to himself and to the city for a period of 29 years, following 17 years of service in other positions in the Gas Department of the Corporation; that there is also placed on record an expression of the Committee's appreciation of his faithful and valuable services, and of the conspicuous ability, foresight, and lofty ideals at all times displayed by him (often at times of serious emergency) in the management and development of the Corporation's gas undertaking, which qualities have won for him the esteem of many national and provincial bodies connected with gas undertakings of which he has been a member; that this Committee bear testimony to the manly characteristics and unfailing courtesy which have endeared Mr. Wood to all those with whom he has been associated, and which have always engendered among all the employees of his Department a feeling of pride in the Department and consequential harmony; and that this Committee express the fervent hope that relief from the responsibility attaching to the post of Gas Engineer of the city will assist in restoring Mr. Wood to good health, and that he may enjoy for very many years his well-earned leisure."

Mr. ERNEST J. SUTCLIFFE, who has been Deputy Gas Engineer and Manager to the Bradford Corporation since 1908, has been appointed Engineer and General Manager in succession to Mr. Charles Wood, lately resigned owing to ill-health. The appointment was made by the Gas Committee on March 11, and is one which gives entire satisfaction throughout the Bradford Gas Department staff, and will be received with gratification also by gas engineers in Yorkshire generally. Mr. Sutcliffe came from Burnley to Bradford in 1891, to take control of the Thornton Road Gas-Works. It was at Burnley—of which town he is a native—that he received his original training. In the course of his career at Bradford, he has received much additional experience by being concerned in considerable alterations and reconstructions of plant. In conjunction with Mr. Wood, he supervised the change-over from horizontal to vertical retorts; and since his appointment as Deputy Engineer and Manager in 1908, he has been concerned in a good many other improvements and developments. Since Mr. Wood's absence, from October last, Mr. Sutcliffe has been in control of the Department, and, of course, has had a particularly arduous task in bringing the work back to normal conditions after the serious disturbance created by the long coal strike of 1926. During that strike, Mr. Sutcliffe was a very active participant in the special measures by which the Department were able to maintain full supplies, and at the same time to release a considerable amount of coal for general public use. Mr. Sutcliffe for many years past has been, in his quiet and unassuming way, one of the warmest supporters and friends of the members of the Yorkshire Junior Gas Association. He formally becomes General Manager on June 1.

At the Liverpool Gas Company's Co-Partners' concert on March 7, a presentation was made to Mr. H. WADE DEACON, the Chairman of the Company. A chairman's chair and a silver inkstand were the gifts, which had been contributed to by all grades in the Company's service. The idea originated with the employee members of the Co-Partnership Committee. The presentation was made by Mr. J. Roscoe, an employee at the Linacre Works, who has served the Company for nearly fifty years. Mr. Wade Deacon, acknowledging the gift, said he was a strong believer in co-partnership, which had been a great success in their Company.

Members of the Lancashire County Council have honoured Alderman HENRY WADE DEACON, the Chairman of the Liverpool Gas Company, by electing him Chairman of the Council in succession to Sir Henry F. Hibbert, Bart. Mr. Wade Deacon has been a member of the Council since 1892; and as Vice-Chairman of the Council and Chairman of the Finance Committee he has been one of the most active and valuable members of this important body.

Mr. JOHN FINDLATER SIMPSON, M.A., B.Sc. (Edin.), of the Gas-Works, Scunthorpe, and Mr. THORNTON WILLEY, M.A. (Cantab), of Duryard House, Exeter, have been elected Associate Members of the Institution of Civil Engineers.

Miss Marjory Waddington, daughter of Alderman J. H. WADDINGTON, the Chairman of the Halifax Corporation Gas Committee, was married on March 4 to Mr. A. C. Crabtree, of Windermere.

OBITUARY.

The death has occurred, at Fulford, York, of Mr. EDWARD BUSHELL, one of the best-known business men in the city, a Director of the York Gas Company.

The funeral took place, on March 2, at Harrogate, of the late Mr. WILLIAM DEIGHTON, who until retirement some time ago was for 63 years in the service of the Harrogate Gas Company.

FORTHCOMING ENGAGEMENTS.

March 17.—MURDOCH LODGE, No. 3480.—Installation meeting.
March 19.—MANCHESTER AND DISTRICT JUNIOR GAS ASSOCIATION.—Visit to the Blackburn Gas-Works and Showrooms.
March 22.—SOUTHERN ASSOCIATION OF GAS ENGINEERS AND MANAGERS (EASTERN DISTRICT).—Meeting at No. 28, Grosvenor Gardens, S.W. 1, at 2.30.
March 23.—EVENING STAR LODGE.—Installation meeting.
March 24.—MIDLAND ASSOCIATION OF GAS ENGINEERS AND MANAGERS.—Visit to the Stanton Ironworks.
March 25.—LONDON AND SOUTHERN DISTRICT JUNIOR GAS ASSOCIATION.—Meeting at the Westminster Technical Institute. Short papers by Mr. J. H. Goldsmith and Mr. S. H. Miles.
March 26.—SCOTTISH JUNIOR GAS ASSOCIATION (EASTERN DISTRICT).—Visit to the Dundee Gas-Works.
March 26.—SCOTTISH JUNIOR GAS ASSOCIATION (WESTERN DISTRICT).—Visit to the Tradeston Gas-Works, Glasgow.
March 30.—SOUTHERN ASSOCIATION OF GAS ENGINEERS AND MANAGERS.—Annual general meeting at the Hotel Cecil, Strand, W.C. 2, at 2.15.
April 1.—BRITISH COMMERCIAL GAS ASSOCIATION.—North Wales, Cheshire, and Lancashire District Conference at Wallasey.
April 2.—MANCHESTER AND DISTRICT JUNIOR GAS ASSOCIATION.—Annual meeting and dinner at Parker's Restaurant, Manchester. Paper by Mr. A. McCulloch on "The Coking of Coal."
April 8.—NORTH BRITISH ASSOCIATION OF GAS MANAGERS.—Annual spring meeting at Dumbarton.
April 12.—FEDERATION OF GAS EMPLOYERS.—Meeting.
April 12.—NATIONAL GAS COUNCIL.—Meeting.
May 5.—EASTERN COUNTIES GAS MANAGERS' ASSOCIATION.—Spring meeting at Ipswich.
May 5.—NORTH OF ENGLAND GAS MANAGERS' ASSOCIATION.—Annual meeting at Newcastle.
May 20.—BRITISH COMMERCIAL GAS ASSOCIATION.—Manchester District Conference at Buxton.
May 26.—MIDLAND ASSOCIATION OF GAS ENGINEERS AND MANAGERS.—Spring meeting at Dudley.
May 26.—SOCIETY OF BRITISH GAS INDUSTRIES.—Annual general meeting and dinner, at the Hotel Cecil.
July 12.—NATIONAL GAS COUNCIL.—Annual meeting.

INSTITUTION OF GAS ENGINEERS.

April 11.—Council meeting.
June 14-17.—Annual General Meeting in London.

Institution of Public Lighting Engineers.

The annual meeting of the Institution will be held at Brighton from Sept. 12 to 15. The members and delegates will be received by the Mayor (supported by the Chairman and members of the Lighting Committee) of the Borough. In addition to the address of the incoming President (Mr. Alex. C. Cramb, Electrical Engineer and Manager, Borough of Croydon), the following papers will be read. "Public Lighting Scheme of the Borough of Brighton," by Mr. J. Christie (Electrical Engineer and Manager, County Borough of Brighton); "Road Traffic and Public Lighting as seen by a Chief Constable," by Mr. R. L. Matthews (Chief Constable of Leeds); "Description of the 'B.E.S.A.' Standard Specification for Street Lighting," by Captain L. B. W. Jolley (General Electric Company) and Mr. Robert Watson (Gas Engineer and Manager, Doncaster). There will be an exhibition of street lighting and appliances, and a visit to the Portslade Works of the Brighton and Hove General Gas Company on Sept. 13. The Chairman (Mr. A. M. Paddon) and Directors of the Company will entertain the Institution at luncheon.

NATIONAL GAS COUNCIL.

Central Executive Board.

The Central Executive Board of the National Gas Council met at 28, Grosvenor Gardens, S.W., on the 8th inst.—Sir D. Milne-Watson in the chair.

Amending Gas Legislation.

Further consideration was given to the proposals which the Council were going to submit to the Board of Trade.

Transport of Coal.

The appointment of a Standing Committee by the Minister of Transport and the Secretary for Mines, to deal with the transport of coal from the coalfields to the ports and internal markets, with special reference to the recommendations of the Royal Commission, 1925, was reported. The Central Executive Board referred the matter to a Special Committee to investigate.

Railway Transport—Eastern Area.

It was reported that very great difficulty was being experienced by gas undertakings in the Eastern Counties with regard to rail-borne coal, owing to the inadequate and insufficient service of the London & North-Eastern Railway Company. This had been particularly severe in the case of undertakings which were entirely dependent on that railway system. It was stated that the Council had had frequent interviews with the Goods Managers of the Railway, as well as with the Mines Department and the Ministry of Transport, as a result of which temporary relief was experienced in some of the worst cases; but as the whole position was still extremely unsatisfactory, it was proposed to raise this question in the House of Commons.

The "Northumberland" Clause.

(*a*) *Bridport Electricity Order.*—It was reported that the local inquiry into the Bridport electricity scheme was held on Feb. 23 and 24, when the Council had supported the Gas Company in their application for the insertion of the "Northumberland" or "Chichester" Clause. The result of the inquiry had not yet been made known.

(*b*) *Hastings Corporation Electricity (Extension) Order.*—It was reported that, acting upon Counsel's advice, the Council were lodging a petition in the House of Lords on behalf of the Hastings and St. Leonards Gas Company for the insertion of the "Northumberland" Clause in the above Order, and that the case would come before a Select Committee in about a week's time.

Rating and Valuation.

It was reported that the Rating and Valuation Committee of the Council had held a conference with representatives appointed by the districts on Feb. 16, with regard to the advisability of the appointment of a Valuer for the areas concerned in connection with the re-assessment of gas undertakings under the new Rating and Valuation Act. The recommendations of the conference were reported; and after discussion it was agreed that the Committee should meet again to consider the subject further.

Liquor Effluent Research.

It was recalled that the question of the disposal of spent liquor by gas-works had been referred last April to a Committee of the Institution of Gas Engineers. Mr. C. F. Botley, the Chairman of that Committee, reported the progress that had already been made in the matter, and the improvement it was hoped to make in the nature of the effluent so as to render it unobjectionable from the point of view of the sewage authorities.

Mains and Cables in Highways—Protective Clauses.

It was reported that a meeting of the Joint Negotiating Committee, consisting of representatives of the highway authorities and of the public utility associations, had been held on Feb. 22; also a meeting of the Conjoint Conference of Public Utility Associations on Feb. 24. Particulars were given of the steps that were being taken to endeavour to reach a settlement with regard to this matter. It was also reported that the conference had appointed a small Committee to meet representatives of the Railways Association and the Canal Association, for the purpose of endeavouring to agree a standard protective clause for insertion in future Bills and Orders.

Date of Annual Meeting.

It was agreed that the annual meeting of the Council should be held this year on Tuesday, July 12, and that the monthly meeting of the Central Executive Board in June should be postponed; but that, if found necessary, an emergency meeting of the Board should be summoned during the week commencing June 13, when a large number of representatives of gas undertakings would be in London attending the annual meeting of the Institution of Gas Engineers.

Retirement of Mr. Chas. Wood, O.B.E., F.C.S.

The attention of the Board was drawn to a report which had appeared in the Press of the retirement of Mr. Chas. Wood as Engineer of the Bradford Corporation Gas Department. The Chairman stated that this news would be received with deep regret by all Mr. Wood's many colleagues and friends in the gas industry. Than Mr. Wood the Council had had no more loyal supporter in times of difficulty; and he, the Chairman, would feel a sense of great personal loss. The Board wholeheartedly supported the proposal of the Chairman that a letter should be sent to Mr. Wood conveying appreciation of his services and the best wishes of the Board for his speedy restoration to health.

World Power Conference.

It was reported that it had been decided to hold a sectional meeting in London of the World Power Conference in October of next year, to deal with Fuel Problems—Coal, Coke, Gas, Oil, Chemicals, &c. For this purpose a guarantee fund would be necessary, which it was suggested should be formed by the chief interests concerned. It was understood that some of the industries interested were willing to contribute to such a fund; and in view of the importance of the subject to the gas industry, the Board authorized the necessary expenditure.

THE EDUCATION SCHEME.

Conference with Representatives of the Junior Associations.

From the Organizing Secretary (Mr. Walter Hole) we learn that the conference on Wednesday last between the Advisory Committee on Education of the Institution of Gas Engineers and the Junior Gas Associations of England, Wales, and Scotland, on the question of whether any amendments in the present Education Scheme are desirable, in order to ensure that it shall provide for, or attract, a larger number of students than it has done hitherto, was well attended, and led to a full and interesting discussion. A memorandum presented by the majority of the Associations, and a separate memorandum presented by the Western District of Scotland, formed the basis of the discussion, at the close of which the Chairman, on behalf of the Advisory Committee, promised that all the points raised would receive careful consideration, and would be the subject of a report and recommendations to the Council before the annual meeting of the Institution in June.

Health Week.—Much of the public interest and enthusiasm taken in health propaganda to-day can be ascribed to Health Week, instituted in 1912 with the object of focusing public attention for one week in the year on matters of health. In 1926 Health Week was observed from Oct. 3 to 9, and this year it will be from Oct. 2 to 8.

"B.C.G.A." NORTH WALES AND CHESHIRE DISTRICT CONFERENCE.

It has been arranged by the British Commercial Gas Association to hold a North Wales and Cheshire District Conference in the Town Hall, Wallasey, on Friday, April 1. The President will be Alderman A. H. Evans (the Chairman of the Wallasey Gas Committee); and the following is the programme of proceedings. An exhibition of modern gas appliances will be on view in a hall adjoining the conference room.

Morning Session.

10.45 a.m. **Welcome by the Mayor of Wallasey, Alderman J. Urmson, J.P.**
Opening Address by the President of the Conference.
National Publicity. Statement respecting work and policy by Mr. W. M. Mason (Manager, "B.C.G.A.").
Discussion.
Address by Mr. H. Hartley, D.Sc., on "The Efficient Modern Gas Appliance."
Local Development Methods at Wallasey.
Papers by Mr. J. H. Crowther (Engineer and Manager), and Mr. H. B. Holliday (Assistant Engineer).
Discussion.
1.0 p.m. **Adjournment for luncheon.**

Afternoon Session.

2.30 p.m. **Public Conference.**
Opening remarks by the President of the Conference.
Subjects for discussion:
(1) Atmospheric Pollution in Relation to Health. Dr. T. W. Naylor Barlow, O.B.E., M.R.C.S., L.R.C.P. (Medical Officer of Health, Wallasey).
(2) Contribution of the Gas Industry towards Reducing Atmospheric Pollution. Mr. Edwin Upton, F.S.A.A. (Treasurer, Liverpool Gas Company).
Discussion open to the public.
4.30 p.m. **Tea.**

BRITISH COMMERCIAL GAS ASSOCIATION.

Meeting of the General Committee.

The General Committee of the British Commercial Gas Association met at 28, Grosvenor Gardens, London, S.W. 1, on Wednesday, March 9—Mr. JOHN E. COWEN, J.P. (the Immediate Past-President) presiding, in the absence of the President, Sir H. Russell Bencraft, J.P.

THE HON. TREASURER.

The Executive Chairman referred to the loss the Association had sustained in the death of Mr. Sydney Y. Shoubridge, who had occupied the office of Hon. Treasurer since the formation of the Association. He referred to Mr. Shoubridge as an ideal and lovable friend, who had maintained his interest in the affairs of the Association up to the time of his death. A vote of condolence was passed in silence, the members rising in their places.

The election of Mr. W. J. Sandeman, who succeeded Mr. Shoubridge as Hon. Treasurer, was approved.

THE EXECUTIVE COMMITTEE.

On the motion of Mr. J. R. H. Jacobs (Southampton), seconded by Mr. J. M. Campbell (Margate), Mr. H. C. Smith (Tottenham) was unanimously elected a member of the Executive Committee, to fill the vacancy created by the death of Mr. Shoubridge.

JOINT CONFERENCE ON THE INSPECTION AND MAINTENANCE OF CONSUMERS' FITTINGS AND APPLIANCES.

In a further discussion on the question of maintenance and inspection, in which many members present took part, the Committee took the opportunity of expressing their appreciation of the manner in which Mr. John E. Cowen had presided at, and his contribution to the success of, the joint conference.

It was resolved that the resolution approved and adopted at the joint conference should be forwarded to the District Associations, with the request that it be considered by the Councils, and that they take what steps they think desirable for bringing the matter before their members, to the end of furthering the policy laid down in the resolution.

HEADQUARTERS' REPORT.

The following Headquarters Report of the Executive Committee was considered and approved:

NATIONAL AND DISTRICT PUBLICITY SCHEME, 1927.—INQUIRIES FROM THE PUBLIC.

The Association's publicity scheme for 1927 commenced in January last; and sufficient advertisements have since appeared to enable an opinion to be formed as to the measure of interest and attention aroused in the public. The inquiries, while not above the average in number, are mostly of a good type—that is, as distinct from applications for catalogues or leaflets.

There have been many letters from consumers seeking the advice and assistance of the Association in matters of local policy; and it is the Association's invariable practice to consult, and wherever possible act in complete accord with, the local undertaking in dealing with these inquiries. Often misunderstanding of local policy is the keynote of the inquiry; and it is gratifying to report that in the majority of cases a mutually satisfactory solution of the difficulty has been found.

The issue of the schedule giving details of the publicity scheme to Scottish and Irish members has been delayed pending the final arrangement of the contracts in the district newspapers; but it is hoped to complete these within the next few days.

SALE OF PUBLICITY MATERIAL.

Since the last report, the sales of Association publicity material have been well maintained, bearing in mind the special circumstances of the past few months. New material suitable for issue in the spring is nearing completion, and will be circulated to members in the near future.

COMMERCIAL ORGANIZATION AND DEVELOPMENT.

In accordance with the instructions of the Committee, details of the service offered by the Association in connection with commercial organization and development have been sent to all members, and a considerable number of important inquiries from all parts of the country have been received. It is inevitable that a little delay must occur in handling some of these inquiries; but it is proposed to give that individual attention which each necessitates as expeditiously as possible.

DEVELOPING COKE SALES.

With a view to assisting members in the planning of campaigns for the development of coke sales, a Coke Service Folder containing suggestions and publicity material was prepared and circulated. While the demand for the publicity material has been practically negligible, yet the several letters received from members encourage us to believe that the folder, as an item of service to members, has been appreciated.

"DAILY MAIL" IDEAL HOME EXHIBITION.

There are several features of this exhibition which are of particular interest to members. There are a number of interesting gas exhibits, chief among which is the display of the London Joint Gas Exhibit Committee. The Board of Overseas Trade also have an important exhibit, one of the principal objects of which is to stimulate public interest in British Empire food products. A feature of this exhibit consists of four demonstration kitchens for showing the preparation and cooking of food. Gas cooking is used solely in each of these kitchens; and this section of the Government exhibit is staffed by competent gas cookery demonstrators.

Closely associated with the exhibition is the Crossword and Ballot Competition, organized by the British Charities Association—acting on behalf of the "Daily Mail." In the Ballot, competitors are asked to place in popular order of importance a number of features of the modern ideal home. The list of features includes: Central heating; electric light; gas cooking; independent hot water; electric power; and gas fires. It will be seen that a fair balance has been exercised as between gas and electricity.

COKE FOR THE FIRING OF STEAM-DRIVEN MOTOR WAGONS.

It was reported that a communication had been received from the "Sentinel" Wagon Works, Ltd., containing suggestions for the development of the use of coke for the firing of steam motor wagons, and that copies of the letter had been circulated to the Councils of the various Commercial Sections for an expression of their views as to the desirability of action being taken.

SIXTEENTH ANNUAL GENERAL MEETING AND CONFERENCE.

It was reported that, in consultation with the President and the Board of the Southampton Gas Light and Coke Company, the date of the sixteenth annual general meeting and conference had been fixed for Monday, the 3rd, to Wednesday, the 5th of October, inclusive, and that the annual dinner would be held on the evening of the Monday, instead of, as usual, on the Tuesday.

DISTRICT CONFERENCES.

It was reported that arrangements had been made for the District Conferences, postponed from last year on account of the general strike, to be held as follows:

Midlands District, at Smethwick on March 16.
North Wales and Cheshire District, at Wallasey on April 1.
Manchester District, at Buxton on May 20.

CHILDREN'S COMPETITION.

It was reported that details of the Children's ("Fairy Gas") Competition for 1927 had been completed, and would be circulated to members in the near future. It was proposed to repeat the awards of two scholarships, value £50, as first prizes in the competition, and that, with a view to extending the popularity of the competition, a leaflet had been prepared for the purpose of bringing the competition more prominently to the notice of parents.

GAS SUPPLY TO WAR DEPARTMENT BUILDINGS.

The draft of a suggested agreement relating to the supply of gas to War Department Buildings was considered; and, after discussion, it was resolved that it be referred to a meeting of representatives of undertakings concerned with the supply of gas to barracks, &c., for full discussion.

TOWN GAS FOR WELDING LEAD.

The Question of Impurities.

A Paper on "The Production of Dissolved Acetylene and its Application to Lead Burning" was read by Mr. W. C. Freeman at a meeting of the Institution of Chemical Engineers on March 9. The term "lead burning," by the way, means the fusing together of two or more pieces of lead—extra lead being added in the form of a strip when strength is required.

In referring to the oxy-coal gas flame, the author said that coal gas, unless compressed in steel cylinders, is confined to shop work where it is already installed. "However," he continued, "the constituent elements of coal gas are such that it cannot be accepted as a pure gas in its application to lead burning."

Discussing Mr. Freeman's paper, Mr. P. Parrish, of the South Metropolitan Gas Company, asked Mr. Freeman to give a detailed indication of the constituents in coal gas which rendered it incapable of being used so far as lead burning was concerned. He himself had been using at least 500 tons of chemical sheet lead a year, the whole of which had been burned by coal gas and oxygen; and from the point of view of chemical plant construction, that lead could not be equalled in any other works.

Mr. Freeman said that coal gas could not be considered a pure gas in comparison with compressed hydrogen, which was accepted as a pure gas, and dissolved acetylene, which was also accepted as a pure gas.

Mr. Parrish remarked that it was a definite fact that coal gas consisted of a number of pure gases, of which acetylene was one. There was nothing associated with coal gas, if it was properly purified, which could possibly be deleterious to its utility as a medium for autogenous welding.

Mr. Freeman agreed that this was so if the gas was properly purified.

ELECTRICITY SUPPLY MEMORANDA.

At the Ideal Home Exhibition.

The Ideal Home Exhibition has not this year a collective electrical display, or a spectacular centrepiece run by the Electrical Development Association; and, therefore, as a piece of demonstration for the industry, the event is not so "ideal" as some electrical men would have liked it to be. The Association were probably too busy with the "Wiring of Britain's Homes Campaign" to be able to stage anything at Olympia. One electrical paper is sorely disappointed at this, as well as over "the absence of adequate electrical service in the actual demonstration houses." The irritation created by these omissions is probably intensified by the fact that the gas industry's propaganda exhibit is there, and is admitted to be rather more elaborate this year than before. But there should be some consolation in the fact that certain big electrical firms—such as the General Electric and the British Thomson-Houston Companies—are well in evidence; and there is a swarm of smaller concerns devoting stands wholly or partly to electrical apparatus. By the way, the "W.O.B." campaign will finish at the end of this month, if there is adherence to the official time-table. The six months have been a mixture of encouragement and disappointment to the promoters. Great enthusiasm has been displayed in some areas; in others, the "campaign" could not be traced.

A "L.C.C." All-Electric Experiment.

There appears to be a vast amount of uncertainty regarding all-electric houses; and, consequently, to the making of experiments with them, there seems to be no end. The London County Council are venturing on another trial, with the view of gaining more experience with electricity for all lighting, heating, and cooking purposes; and the victims are to be the tenants of 57 houses on the Castelnau Estate. This, however, shows that up to the present the Council are not satisfied regarding the boasted superiority of electricity for cooking and heating, inasmuch as in 599 houses on the same estate, while electricity will be used for lighting, gas is to be employed for cooking, heating, and other domestic purposes. In such an experiment with electricity for all cooking and heating, the Council cannot very well set a time-limit if they want to get thorough experience. They must run long enough to obtain some idea of a winter's cost with all-electric heating, and long enough for the tenants to be able to "speak their minds" respecting the operating time, unreliability, uneconomy, and limited range of utility of the electric cooker compared with the gas cooker. Time is also required to gain knowledge regarding the depreciation of elements, and the lowering of their confessed initial poor efficiency. The subjects of the experiment have our deepest sympathy, particularly if no provision, other than by electricity, is to be made for heating in winter and hot water supply. But the report of the Housing Committee is plain: "We propose as an experiment, to instal electricity not only for lighting, but also for cooking, heating, and domestic purposes in a group of 57 houses."

Installation Costs.

The Committee give information as to installation costs and the charges for current. The Barnes District Council, in whose area the houses are situated, are not willing to undertake their wiring and the maintenance of the installations; but they will lay the cables and provide the necessary services free of cost to the Council. It is estimated that the outlay for wiring the 57 houses for lighting, heating, cooking, and domestic purposes, will amount to about £1082, or approximately £20 16s. per house. The wiring for lighting only of the remaining houses (599 and the superintendent's house and administrative buildings) is estimated to cost £6887, or an average of £11 6s. For the 599 houses, the Gas Light and Coke Company are providing a service to each, one gas cooker, a lighting point in the scullery, and a gas-fire in one bedroom, at a charge to the Council of £1 a house—the tenants paying through prepayment meters at ordinary rates. The charge by the Barnes District Council for current for lighting is 4d. per unit, or a quarterly payment of 2½ p.ct. on the rateable value of the premises, and a charge of 1d. per unit consumed during the winter months and ½d. during the summer. This means that the 1d. will apply to the months of heaviest consumption for cooking and heating in the 57 houses. In addition, the tenants will have to provide their own electric appliances, or the District Council will let on hire to them a cooker, wash-boiler, two portable fires, a kettle, and a flat iron. The capital expenditure for the wiring is to be recouped by the County Council in the weekly rents. Thus the tenant of an all-electric house will have to repay the Council the £20 16s. wiring installation expenses, as compared with the £11 6s. in the case of the houses using electricity for lighting only, and gas for the other services. They will also have to bear the hiring charges for the electric appliances. Just recently, the Education Committee of the County Council in a report on electric cooking experiments at four domestic economy centres stated: "We are of opinion that, in view of the information we have had before us, unless and until the time comes when cooking by electricity is proved to be definitely more economical than cooking by gas—giving rise to a widespread desire on the part of housewives for electrical equipment in preference to gas—no special case exists for the general introduction of electric cooking into the Council's domestic economy centres." That being the verdict from places where there are cookery experts, what will be the decision of the householders (who will not be experts) in the 57 experimental houses? They will probably consign the County Council and their experiment to a place which would not be the personal choice of the members of that august assembly.

Other Experiments.

It is not disputed that, on housing estates—especially those of municipalities with electricity undertakings under their control—electricity has obtained a fairly large innings for lighting purposes. Where both gas and electricity concerns are administered by a corporation, although the members know very well that for all purposes in dwellings such as are constructed on housing estates, gas is the superior agent, they feel they must give way to the appeals of the electricity department to be allowed to show what their commodity will do not only for lighting, but for cooking and heating. This, to a large extent, is the explanation of the experimental all-electric houses that have become dotted about the country, an important feature of most of which trials is that the current for all purposes is supplied on the two-part tariff. Just recently the "Electrical Times" collected some information on the subject. It gave, from its "Contracts Open" or "Contracts Closed" columns, figures relating to the wiring of new houses in 74 different towns; and they disclose that in fourteen months these towns have invited tenders for the wiring of an aggregate of 10,000 houses—the highest number for one town being 800 and the lowest 12, the average working out to approximately 135. Comparatively, this represents a small number of towns, and the houses a small number compared with the total in the country. At the same time, the quoted figures do not include several towns which have not appeared in the "Contracts" columns of our contemporary, nor the London County Council and various Metropolitan Boroughs. The Electrical Engineers of some of the towns have supplied our contemporary with information as to their experimental work with all-electric houses. At Wakefield, of the total number of municipal houses which have been wired—numbering some 1100—50 just completed are wired and equipped throughout with electric heating and cooking appliances. As an experiment, a tariff consisting of a standing charge of 1s. per week to cover the hire of the complete electric cooking and heating apparatus, *plus* 1d. per unit for all energy consumed, has been instituted. Prepayment shilling-in-the-slot meters are installed in the houses. The Corporation have recently commenced the erection of 114 subsidy houses (owner occupied); and practically the whole of those which have been completed are equipped electrically—the tenants hiring both cookers and wash-boilers from the Electricity Department. From Halifax the information is given that, in a private scheme, 24 of the houses have had radiators installed, in 19 electric cookers, and in 14 electric boilers.

Figures from Manchester.

Information from Manchester is particularly interesting. Up to date 6000 houses have been built on corporation housing estates; and everyone is wired for electric lighting, while gas services are provided for heating and cooking. On the Burnage Estate, the Electricity Committee are conducting experiments in "all-electric" houses, and 58 have been fitted throughout with electricity for lighting, heating, cooking, and washing. The equipment consists of lighting fittings, (mark this!) a coal range, two portable radiators (plugs for the use of these are fitted in the bedrooms, living rooms, and parlours), a standard type of electric cooker in the scullery, a three-pint electric kettle, an electric wash-boiler, and a plug socket from which an electric iron, vacuum cleaner, or a small cooking appliance can be operated. The apparatus is maintained free of charge by the Electricity Department against fair wear and tear and all ordinary usage. The charge for the hire of the cooker is 5s. per quarter upwards according to size; for radiators and wash-boilers no charge is made. For electricity, the "all-in" tariff rate for domestic lighting and power consists of an annual fixed charge equal to 20 p.ct. of the net rateable value (1914). Post-war assessments are subject to a deduction of 30 p.ct. The running charge is ½d. per KW.-H. metered. The fixed charge in the "B3" houses is £3 8s. per annum, or 17s. per quarter, based on a net rateable value of £24 5s. The fixed charge in "A3" houses is £2 14s. 7d. per year, 13s. 8d. per quarter, based on a net rate-

able value of £19 10s. The estimate of cost for a family of five persons living in one of the Corporation houses ("B3" type) is as follows:

	£ s. d.
Annual fixed charge	3 8 0
150 units for lighting	
1750 ,, ,, cooking	
500 ,, ,, washing	
50 ,, ,, ironing	
500 ,, ,, electric fire	
Total 2950 at ½d. unit	6 2 11
	£9 10 11
Add hire of cooker (medium size) .	1 10 0
	£11 0 11
(or 4s. 3d. per week.)	
To the above should be added the cost of coal for the living-room, assuming the range to be in constant use throughout the year—say, 80 cwt. at 2s. 3d. per cwt.	9 0 0
Total cost of electricity and coal . (or 7s. 9d. per week.)	£20 0 11

It will be noticed that electric heating is of comparatively small dimensions—notwithstanding the length of our winter and the conditions of our climate. It will also be observed that the running charge is only ½d. per unit, and that, including the annual fixed charge, according to the estimate of 2950 units consumed, the average cost per unit is only 0·77d., without the hire of the cooker. Adding the hire of the cooker, the total cost for electricity averages 4s. 3d. per week, and, with the coal consumption, 7s. 9d. per week. Even with such a low charge for electricity, the tenants of such houses will regard the £11 0s. 11d. per annum for electricity as fairly steep, and the £20 0s. 11d. (including coal) as decidedly oppressive. It is interesting to point out that the 2950 units of electricity are equal to 100·65 therms, whereas the £9 10s. 11d. which those units cost at ½d. per unit, *plus* the fixed charge, would purchase gas (at 10d. per therm) equal to 229 therms—this despite the extraordinarily low charge per unit. It shows to what length the electrical people have to go, in order to try to persuade householders to patronize electric energy for all domestic purposes. Regarding gas supplies to housing estates, our electrical friends may find considerable interest in the paper which Mr. A. A. Whitney, of Doncaster, read at a recent meeting of the West Riding of Yorkshire Gas Salesmen's Circle, and which was published in the "GAS SALESMAN" Supplement to last week's "JOURNAL."

The Average Price.

"The Electrical Review" has been advising its readers to cheapen electricity; but it admits that no two areas of supply are alike, and local conditions vary so considerably that it is impossible to criticize prices without examining all the relevant facts. It admits that the supply of electricity differs fundamentally from that of gas and other commodities which can be produced and stored at one time, and then be distributed at another. The load factor and the nature of the load must be taken into account; the average revenue obtained per KW.-H. being only part of the story. In the Weir Report, the average price charged to consumers by statutory concerns for all purposes in 1923 was stated to be 2·047d. But it was estimated that, under the then existing conditions, the average price for public supply would by 1940 probably not be lower than 1·75d., and certainly not less than 1·5d. But the scheme submitted in the report, it was calculated, would reduce the average price by 1940, or when the consumption reached 500 KW.-H. per head, to 1d. or under. The return issued by the Electricity Commissioners for 1924-25 indicated that the average revenue from the sale of energy of all statutory undertakers was 1·75d., which compared with 1·86d. in 1923-24. Our contemporary points out that, if this rate of progress could be maintained, by 1931 the goal aimed at by the Weir Committee of 1d. per KW.-H. would be attained without the help of any new Act or Board. On the strength of this, it is claimed that on the whole electricity is relatively cheap in this country. Nevertheless, the "Review" is far from satisfied with the position, as the fact remains that the charges for light and other domestic uses are often higher than they should be. The undertakings concerned will probably dissent from this view of our contemporary, but will respectfully consider its counsel that they should take their courage in both hands and offer their domestic consumers really attractive terms. It suggests that many undertakings are too cautious, and wait for the demand to reduce the price, instead of reducing the price to increase the demand. To lower prices to increase the demand is all right up to a point, but it can be carried too far—so far that it would result in bankruptcy. However, on the general subject, the presentation of low average prices for electricity does not in the least stir us. They are no indication of actual prices, in view of the wide margin which exists between them. With industrial low-priced power units swamping the units consumed for lighting and other domestic purposes (which are charged at much higher rates), it is very easy to get down to a low average figure, which is no criterion of what is being paid by domestic consumers.

INSTITUTION OF CHEMICAL ENGINEERS.

Annual Dinner.

The annual dinner of the Institution took place at the Hotel Victoria, on Friday, March 1—Sir FREDERIC NATHAN, K.B.E., presiding. The principal guest was the Rt. Hon. Sir Herbert Samuel, and among those present were Sir Frank Heath, Sir Arthur Duckham, Dr. W. H. Eccles, F.R.S. (President of the Institution of Electrical Engineers), Mr. F. Palmer (President of the Institution of Civil Engineers), Mr. W. Reavell (President of the Institution of Mechanical Engineers), Mr. F. H. Carr (President of the Society of Chemical Industry), Sir Joseph Petavel (National Physical Laboratory), and Dr. C. H. Lander (Director of Fuel Research).

Sir HERBERT SAMUEL, proposing "The Institution of Chemical Engineers," said that, though only four years old, the Institution showed all the signs of healthy and vigorous growth. He had been, so to speak, sentenced to six months' hard labour when he was appointed Chairman of the Coal Commission; and the members of that Commission, after an exhaustive and exhausting inquiry, came to the conclusion that the future of the coal industry depended very largely upon the adoption of a successful economic process of distillation. It was essential that those responsible for the Government should attach full value to science; and the establishment of the Department of Scientific and Industrial Research was a step of immense importance. The prosperity of the nation depended upon the success of its industries, which were dependent on industrial chemistry.

Sir FREDERIC NATHAN, replying to the toast, said the Institution could fairly claim to have advanced in all directions during the past year. The membership had increased by 78, the third volume of "Proceedings" had been issued, the library had been enlarged, the sphere and influence of the Appointments Bureau had been extended, and in instituting an examination scheme it would be admitted the Council had taken a step of great importance in enhancing the position of the members of the scientific, technical, and commercial world. The results of the examination held by the Institution were disappointing, except in so far as they disclosed the great need that existed for educational facilities. It was to be hoped, now that definite information of the requirements of the Institution was available, that the educational authorities would assist the rising generation to acquire the knowledge necessary to enable them to become members of a profession essential to the well-being of the country.

Sir ALEXANDER GIBB, proposing "Kindred Institutions," said that at the present time there were 84 engineering and technical institutions in this country; and he expressed the hope that the near future would see a drawing-together of these bodies, all of which had certain interests in common.

Dr. W. H. ECCLES, replying to the toast, claimed that the great improvement in the conditions of living of the working classes of this country was due in the main to the work of the engineering and scientific institutions. Notwithstanding this, these institutions were not allowed to take any part in the conduct of the affairs of the nation, and had extremely little influence upon the policy of the Government. They were, moreover, scarcely heard at all in the counsels of those who dictated the circumstances and the legislation affecting even their own professions. It was for this reason that he welcomed the suggestion that the kindred institutions should come together, in order to bring some influence to bear upon the affairs of the nation.

Sir ARTHUR DUCKHAM, proposing "Our Guests," said he wanted to impress upon them very strongly that the chemical engineer was the man of the future. There was great need for trying to get education in this country suitable for the chemical engineer. What were wanted was the fundamental engineer and the fundamental chemist. Afterwards they could specialize in the line they wished; but they wanted first of all, in their education, fundamentals. Hitherto they had lacked fundamentals in this country. For this reason, he would like to see a closer touch, during the training of the student, between the university and industry and commerce. It behoved all connected with big undertakings to open their doors to students in the long vacation, and at other times, so that the students might come into the works and see the processes carried out. On the other hand, he would much like to see commercial technical men going into the universities and lecturing from time to time, and setting some examination papers, thus taking the commercial side into the universities. He had spoken at a great many public schools and at conferences of headmasters; and there was undoubtedly a great desire on their part that the boys should see something of the lives they would have to lead in industry after they left the colleges. He personally would like to welcome to the works of the country the professor and the teacher. It was very important that the teacher should be kept in touch with modern business and technical methods, in order to see what industry wanted and the training that was necessary for those coming from the colleges into industry. There was also another point he wished to put. Great developments were ahead. He was an optimist, and not one of those who were ready to decry this country, and say it was going down. A motto which he always used was "Everything is possible;" and this would not be a bad motto for the chemical engineer.

"L & N" COAL DISTILLATION.

Aims and Objects of the New Company.

Articles which have been published in the "Journal" (see particularly "Journal" for Dec. 9, 1925, p. 654) will have acquainted our readers with the "L & N" coal distillation process, with which, as a result of inspection of the plant at Barugh, Barnsley, and close considerations of the working results, we are most favourably impressed. The plant at Barnsley, on which future larger units are to be based, is extremely flexible. The retort consists of a firebrick lined cylinder, slightly inclined, which slowly rotates. The distilling medium can be varied to suit the end products required, and the type of raw material treated. It can be the products obtained from the combustion of producer gas with secondary air, straight non-combusted producer gas carrying the sensible heat due to the gas reaction, superheated water gas, or a re-heated circulating gas. Thus, where the problem is to produce a gas which will serve as a diluent for town gas, superheated water gas is employed as the distilling medium. As was explained in the article referred to in the opening lines of this paragraph, the water gas, which is heated in a heat interchanger placed in the circuit, may be circulated through the retort as often as desired, picking up on its way the distillation gas from the coal, and thereby being enriched to any desired extent. The surplus gas can be removed from the system from time to time, and the deficit made up by a fresh admission of water gas.

The Products.

Apart from gas, the products are oil and smokeless fuel, in common with many other systems of low-temperature carbonization. The oils produced, however, differ from those of other processes in that they are uncracked low-temperature products, eminently suitable, after fractionation, for use in the Diesel engine, or as lubricants; and there is also a quantity of motor spirit. The temperature of the distilling medium entering the retort is about 650° to 700° C., and it leaves the retort at about 150° C. The temperatures of the coal itself are from 100° to 120° C. below these temperatures. Consequently, immediately the oily vapours are distilled from the coal they are swept into zones of ever-decreasing temperatures, and are therefore recovered in their pristine state. This is one of the fundamentals of the success of the "L & N" process.

The New Company.

The plant at Barnsley was run by Sensible Heat Distillation, Ltd., whose Managing Director, Major Laing, provided for many years the funds necessary to perfect the process and erect the plant at Barnsley and elsewhere. At the beginning of this year a Company was formed with a capital of £250,000 for the purpose of acquiring from Sensible Heat Distillation, Ltd., the British rights of the "L & N" process. The name of this new concern is "L & N" Coal Distillation, Ltd., and the Joint Managing Directors are Colonel J. T. C. Moore-Brabazon, M.C., who has resigned his position as Parliamentary Secretary to the Ministry of Transport, on account of his new work, and Major Laing. These two gentlemen are Joint Managing Directors of both "L & N" Coal Distillation, Ltd., and Sensible Heat Distillation, Ltd. The Board, of which Colonel Moore-Brabazon is Chairman, is constituted as follows: Mr. P. C. Tennant (Chairman and Managing Director of the Glico Petroleum Company; Director of the Phœnix Oil and Transport Co.). Colonel K. P. Vaughan-Morgan, M.P. (Director and Vice-Chairman of the Morgan Crucible Company). Mr. W. A. Woodeson, Gateshead-on-Tyne (Director of Messrs. Clarke, Chapman, & Co.; Chairman of the Chesterfield Tube Company). Mr. Frank Middleton, Barnsley (Joint Managing Director of the Old Silkstone Collieries; Managing Director of the Garforth Collieries). Mr. Henry Ellison, Leeds (Messrs. Ellison & Mitchell, Don Chemical Works; Director of the Yorkshire Iron and Coal Company). All the money the Company require has been privately subscribed.

It is proposed to develop by the "L & N" process the largest oleiferous coal seam in the world, at Morwell, Melbourne.

On March 8, Colonel Moore-Brabazon invited members of the Press to a luncheon at the Savoy Hotel, to hear something about the aims and objects of the new Company. In the reception room samples of the products of the "L & N" process were on view, and a bright fire demonstrated the free-burning properties of "L & N" fuel in an ordinary firegrate.

Colonel Moore-Brabazon said that Britain was essentially a coal country. Their wealth and their industrial supremacy depended upon coal. At the time of their greatest prosperity they were not only a producer of fuel, but an exporter. Engineers, in seeking a cheap and convenient prime mover, had found a substitute in many cases in oil, and in doing this they had, to make a comparison, been "so interested in the trees as to lose sight of the wood." They must always remember the basic fact that when they passed from using coal to using oil they became importers of fuel rather than producers, and that every oil-burning steamer that was launched put miners out of employment. The subject of coal treatment was not a new one. The best-known systems, of course, were the ordinary gas-works and coke ovens. These were high-temperature processes. Theirs was a low-temperature system. Low-temperature carbonization had had, in the past, a rocky career. There were great difficulties in the realization of this treatment; but it was because they believed that they had a successful process to offer that they had formed this new Company to prove up to the hilt in full-size plants the commercial advantages of the "L & N" system.

Oil from Coal.

There were two schools of thought on the production of oil from coal. There was one in which it was thought that the best way was to turn the coal into oil by a somewhat complicated method of subjecting the coal to a high pressure of hydrogen—a pressure of about 1500 lbs. per sq. in. This was known as the Bergius method, and was being developed abroad. The "L & N" process, on the other hand, was one which extracted oil already existing in the coal, and left the coal oil-less, but in an even more satisfactory state to be burnt than before. One of the troubles hitherto experienced in low-temperature carbonization was the fact that the oils derived from the coal had been spoilt in producing them. They had "cracked;" and a cracked oil was of little value, being of use only as fuel oil. The oil derived from the "L & N" process was in the true sense a primary product, from which all the fractions that well oil gave could be derived—petrol, paraffin, gas oil, Diesel oil, lubricating oil—besides a product which well oil did not give—namely, phenol. Tests by the National Physical Laboratory showed that "L & N" lubricating oil possessed properties which made it as valuable and as useful as the best lubricating oils on the market. When he told them that all but 2 p.ct. of lubricating oils used in this country came from America, it would be seen how important was this new home-produced lubricant.

A Tribute to Mr. Nielsen.

Colonel Moore-Brabazon went on to say that Mr. Harald Nielsen and Major Laing were the two most responsible for the development of the process. Mr. Nielsen, a Dane, was one of the most brilliant coal chemists in the world. He was one of the few asked to lecture at the recent International Conference on Bituminous Coal held at the Carnegie Institute of Fuel Technology, Pittsburgh; and he had been invited to address the German Chemical Society next June, at Essen, on their fortieth anniversary, on oil and fuel. Colonel Moore-Brabazon also mentioned the help they had derived from Dr. Stanley Baker, Dr. G. S. Haslam, Mr. G. Hamilton, and Mr. W. A. Collis.

Future Development.

The plant they had at Barnsley was no toy. It could pay its way; and it was the intention of the new Company to build bigger installations dealing with 100 tons of coal per day per unit. Batteries of units could, of course, be installed. Because the plant was analogous to an ordinary cement kiln, but not so big, few mechanical difficulties could arise. A cement kiln was subjected to 1500° C., and lasted for years. Those installed fifteen years ago were still in perfect order. Their 100-ton retort was smaller, and worked at half that temperature.

He had not alluded to the "L & N" fuel, 14 cwt. of which was produced out of every ton of coal. Part of this was actual smokeless fuel for burning in an open hearth; and this could be sold at 20s. a ton. What was too small for such use was an ideal fuel for burning in a pulverized form for steam generation. It had advantages over pulverized coal, in that it was non-explosive, was easier to grind, and burned with a shorter flame. It could be pumped in a pulverized form along pipes into bunkers, behaving in this respect like oil. It could be burnt like fuel oil under boilers, but had the advantage that it gave equal heat results at half the cost of oil. There was a large and increasing demand for its use; and they had no misgivings as to the markets open for its consumption.

Captain Brand (R.A.N.) remarked that in Australia they had abundant coal but no oil supplies; and as oil was becoming the one fuel for the Navy, and pulverized smokeless fuel could be used so well for the merchant services, the splitting-up of their coal into these two products by the process outlined by Colonel Moore-Brabazon was to be encouraged from the point of view of utilizing national resources. He hoped the gas produced by the "L & N" system would be used by the gas undertakings.

Mr. W. Diamond explained that the structure of "L & N" fuel rendered it easily ignitible, and Mr. Frank Middleton, who has investigated practically every system of low-temperature carbonization, expressed the opinion that the "L & N" process had greater potentialities of commercial success than had any other system.

The following assumptions relating to an "L & N" plant (capacity, 500 tons of raw slack coal per day) are of interest.

Approximate Cost of Installation, £150,000.

Expenditure.

	£
175,000 tons of slack coal at 5s. per ton	43,750
Depreciation at 10 p.ct.	12,500
Maintenance at 2½ p.ct.	3,125
Labour—15 men at 10s. 0½d. per shift, 4 foremen at 12s. 6d. per shift	8,900
Water	437
General stores	1,925
Power, electric	1,500
Rates and taxes	1,500
Management, office, directors, insurance (say)	5,000
	£78,637

Revenue.

	£
By "L & N" fuel at 5s. per ton, 114,000 tons	28,500
By 3,250,000 gallons of oil at 6d. per gall. (recently sold at 8d. per gall.)	81,250
	£109,750

Profit, £31,113, equivalent to over 4s. per ton of coal distilled.

Note.—There is no outlet for the gas, so this is used for distilling.

DINNER IN HONOUR OF SIR DAVID MILNE-WATSON

GIVEN BY THE GOVERNING BODIES OF NATIONAL ORGANIZATIONS OF THE GAS INDUSTRY.

A MEMORABLE GATHERING AT THE SAVOY HOTEL.

Prof. A. Smithells, C.M.G., F.R.S., D.Sc., in the Chair.

[*Photo. Beresford, Yeoman's Row, S.W. 3.*

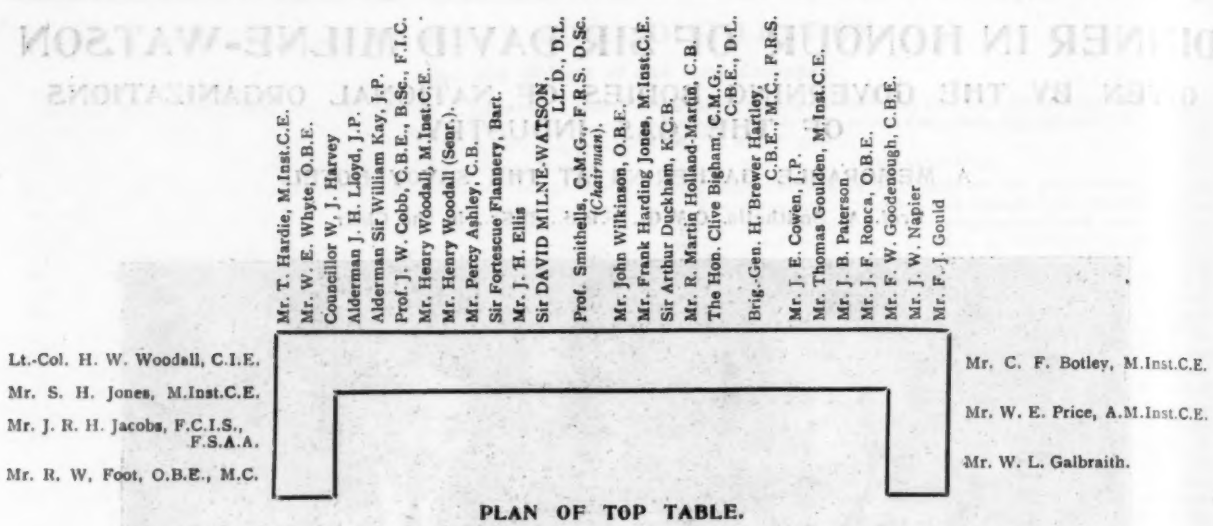
SIR DAVID AND LADY MILNE-WATSON.

It was a remarkable gathering at the dinner at the Savoy Hotel on Tuesday evening of last week. Those present were the representatives and delegates of all the central organizations which safeguard and forward the political, technical, and commercial interests of the gas industry. They were there to do honour to one man who has been not only a guide, philosopher, and friend, but an indefatigable worker in the common interests. His work has not been confined only to the gas industry, for the knowledge gained in a wide realm of experience has been devoted to work of a public character to which the Government of the country has invited him. Sir David Milne-Watson having been honoured by His Majesty the King, the opportunity was one which the gas industry gladly took of showing its appreciation of his self-sacrificing work, and of a man who has devoted ability, time, and influence to the general good. The representatives of the industry came in their strength from north, south, east, and west. We saw there every interest represented—administrative, technical, commercial, and the section engaged in manufacturing gas plant and appliances. The National Gas Council, the British Commercial Gas Association, the Institution of Gas Engineers, the Gas Companies' Protection Association, the Federation of Gas Employers, and the Society of British Gas Industries were all represented. Presiding at the board was Prof. Arthur Smithells, C.M.G., F.R.S., and to his right sat Sir David. To right and left of the guest were many of the chiefs of the organizations with whom he works year in, year out; and facing him, at circular tables covering the immense and picturesque dining hall, were those who in some way or other participate in that work. It was an outstanding function in the annals of the gas industry, for it crowned the work of many arduous years—years for the country and the industry without precedent in enormous difficulty. The reception accorded to Sir David was of a nature almost overwhelming. In it from beginning to end there was genuine admiration and thanks. There was hearty endorsement of all the speeches—particularly of the eloquent one of the Chairman; there was enthusiasm in singing "For He's a Jolly Good Fellow;" and the words of "Auld Lang Syne" with which the evening concluded reflected sincere gratitude for work done. More peaceful days, it is believed, confront us. But the spirit of competition is intense; and the future holds for Sir David, as for the rest of us, work which will be equally hard, but more congenial and fruitful.

Apologies for Absence.

After the honouring of the Loyal Toast,

The Chairman said: I have before me a long list of those who would gladly have been present to-night, but who for reasons that could not be overcome are absent. I will not detain you by giving the list; but I must mention with special regret the absence of Mr. William Cash, who is ill; Mr. Reginald Clarry, M.P.; Sir Albert Ball, of Nottingham; Mr. A. W. Smith, of Birmingham; Viscount Ednam, M.C., D.L.; the Right Hon. Lord Riddell; Sir Dugald Clerk, K.B.E., F.R.S., D.Sc., LL.D.; Councillor W. J. Crookes; the Right Hon. the Lord Provost of Edinburgh; the Right Hon. the Lord Provost of Glasgow; the Right Hon. the Lord Mayor of Manchester; Sir H. W. Russell Bencraft, M.R.C.S.E., J.P.; Alderman Sir Joseph Calvert; Sir G. E. Davies, J.P.; the Right Hon. Sir Alfred Mond, M.P.; and Sir Percy K. Stothert, K.B.E., M.Inst.C.E.


Mr. T. Hardie, M.Inst.C.E.
Mr. W. E. Whyte, O.B.E.
Councillor W. J. Harvey
Alderman J. H. Lloyd, J.P.
Alderman Sir William Kay, J.P.
Prof. J. W. Cobb, C.B.E., B.Sc., F.I.C.
Mr. Henry Woodall, M.Inst.C.E.
Mr. Henry Woodall (Senr.).
Mr. Percy Ashley, C.B.
Sir Fortescue Flannery, Bart.
Mr. J. H. Ellis
Sir DAVID MILNE-WATSON, LL.D., D.L.
Prof. Smithells, C.M.G., F.R.S. D.Sc. (Chairman).
Mr. John Wilkinson, O.B.E.
Mr. Frank Harding Jones, M.Inst.C.E.
Sir Arthur Duckham, K.C.B.
Mr. R. Martin Holland-Martin, C.B.
The Hon. Clive Bigham, C.M.G., C.B.E., D.L.
Brig.-Gen. H. Brewer Hartley, C.B.E., M.C., F.R.S.
Mr. J. E. Cowen, J.P.
Mr. Thomas Goulden, M.Inst.C.E.
Mr. J. B. Paterson
Mr. J. F. Ronca, O.B.E.
Mr. F. W. Goodenough, C.B.E.
Mr. J. W. Napier
Mr. F. J. Gould
Lt.-Col. H. W. Woodall, C.I.E.
Mr. S. H. Jones, M.Inst.C.E.
Mr. J. R. H. Jacobs, F.C.I.S., F.S.A.A.
Mr. R. W. Foot, O.B.E., M.C.
Mr. C. F. Botley, M.Inst.C.E.
Mr. W. E. Price, A.M.Inst.C.E.
Mr. W. L. Galbraith.

PLAN OF TOP TABLE.

The Chairman.

The Chairman: In drinking the health of the King, I am sure it must have been in your minds that it was His Majesty's gracious act that gave the immediate impulse to this gathering. It has pleased His Majesty to confer upon his, and our, trusty and well-beloved David Milne-Watson the honour of knighthood; and we are assembled to give evidence to Sir David of how much we rejoice in this event, and to take a welcome opportunity of giving some expression of the esteem in which he is held among us. ["Hear, hear."]

By a turn of fortune, which I assure you has left me in what I can only describe as a state of grateful bewilderment, I find myself in this place of honour, and the first speaker to commend to you the toast of the evening. Others more competent than I will follow me—men who know intimately the character and range of Sir David's work, and can speak with an authority that I could not for a moment assume. I am only what you know I am—a man of science who long ago wandered into your territory, has been allowed to remain among you, has watched the vicissitudes of your industry with eager interest, and has had the great privilege of becoming acquainted with its leaders. I have known Sir David since his early days among you; and so I know how justly you honour him. What can I individually say on this occasion? Gladly indeed do I offer the homage of a man of science to a great and enlightened industrialist, and, reckoning myself for the moment as outside your industry, confidently do I acclaim Sir David as an exemplar of what the state of the nation calls for to-day more urgently than it has ever called before—leaders of industry in whom are to be found united the highest standards of integrity, ability, enterprise, and humanity, men true to the best traditions of the British industrial world, yet ready to face new problems in changing times, and to avail themselves of all the new resources which in latter days have come in such abundance from the growth of knowledge.

I have seen Sir David in days of great anxiety; I have seen him confront problems of the utmost difficulty; I have never seen him waver; and I have never seen him fail. ["Hear, hear."] Wherein lies the explanation of his success, I will not venture to say. To have been born and schooled in Scotland, to have graduated at Edinburgh, to have been at Balliol College, Oxford, to have made a serious study of the law, to have spent seasons in foreign lands—all this means much; but how much, who will say? It is a record to make one think, and thoughts arise that are not easy to express. I am led to think of Sir David's studies of the Greece of ancient days. The Greeks, we are told, "had great quickness and fineness of perception, which made them feel at once when anything was exaggerated. One of their favourite mottoes was 'Do nothing too much.' They were naturally obedient in all things to a sense of fitness and measure." Again, in thinking of our guest, I recall the words, far better than any I can use, of a great economist. He says:

> I want to suggest that there is much latent chivalry in business life, and that there would be a great deal more of it if we sought it out and honoured it as men honoured the mediæval chivalry of war . . . it includes a delight in doing noble and difficult things because they are difficult . . . it includes a scorn of cheap victories, and a delight in succouring those who need a helping hand. It does not disdain the gains to be won on the way, but it has the fine pride of the warrior who esteems the spoils of a well-fought battle, or the prizes of a tournament, mainly for the sake of the achievements to which they testify, and only in the second degree for the value at which they are appraised in the money of the market.

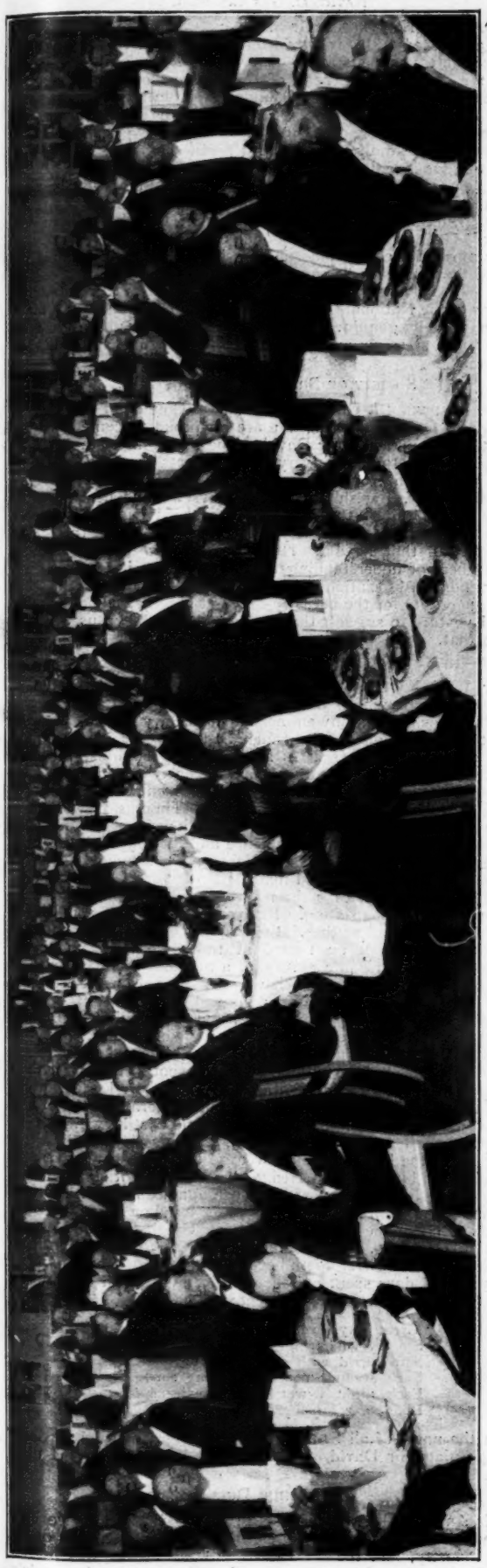
You will understand why I regard this as so relevant to the subject of our toast. You will think of Sir David with his quiet strength and reticence, doing and saying what is enough, minding his own business—not in any narrow sense, but the business of this great industry—not stepping forth as a superman with panaceas to set the whole world right. I see in him as much as in any man I have known those traits which go to make up what Alfred Marshall has so justly extolled as economic chivalry. We rejoice to honour him to-night, and we recognize in him a leader undaunted by difficulties and unspoiled by success.

And now, after these imperfect words, I will call upon others to make good where I have failed.

British Commercial Gas Association.

Mr. J. E. Cowen, J.P., Past-President of the British Commercial Gas Association, and Chairman of the Newcastle-upon-Tyne and Gateshead Gas Company: As one who objected to the infliction upon you to-night, and particularly upon Sir David Milne-Watson, of eight or nine speeches to propose one toast—a toast which could have been, and in fact has been, ably and adequately proposed by our Chairman, I will not take advantage in any shape or form of the "draw for places." [Laughter.] I find myself in the position I occupy through the unavoidable absence of Sir Russell Bencraft, who is President of the British Commercial Gas Association this year; and I would like to read a telegram I have received from him. In this Sir Russell Bencraft says: "Express to our guest Sir David Milne-Watson my hearty congratulations and most sincere regret for absence." He would have been here if at all possible; but the state of his health has prevented him. I think that there are a large number of members of the "B.C.G.A." who are represented here by bodies for whom others will speak; but at the same time there are many—chairmen and members of municipal gas committees, directors of provincial gas companies like myself, &c.—who are not represented by other bodies connected with the industry, and I am sure that they wish, as I personally wish, to be associated with the congratulations and thanks that are offered to Sir David to-night. Congratulations upon the honour that has been conferred on him by the King, and thanks for all that he has done on behalf of the gas industry. ["Hear, hear."] The members of the "B.C.G.A." appreciate very much the support that they have always received, from the foundation of the Association onwards, from the head of the largest Gas Company in the country—the Gas Light and Coke Company. The Association were fortunate in having the support from the outset of the late Sir Corbet Woodall, of revered and respected memory. If not actually the first President, Sir Corbet at any rate presided at the first conference; and he supported the Association whole-heartedly. Since Sir David succeeded him, he has equally given support in a whole-hearted manner to the work of the "B.C.G.A." He has not only passed through the Presidential Chair, and presided at their annual conference in Glasgow, but he has in every way done all that he can for the Association. It is only what would be expected from one who has shown that spirit of enlightenment, progress, and service to the public that Sir David has manifested in all his dealings. He has, moreover, shown a particular interest in the work of our Association by the way in which he has allowed, and his co-Directors have allowed, the chief officials of his Company to devote time and energy to the work of the Association. We all know the work the Executive Chairman of the Association has done; and this work has been only possible because of the whole-hearted support of Sir David, who has always thoroughly backed it up.

In addition to all this, I need not say how much members of our Association appreciate the personal service that Sir David has given to the industry as a whole. For some years we have



THE SETTING OF THE SAVOY BANQUET IN HONOUR OF SIR DAVID MILNE-WATSON.

looked to him as the leader of the industry; and we have not looked in vain. We have had a leader whom we all trust and all look up to; and I venture to say that, so long as he is actively connected with the industry, this leadership will not fail us. I wish, on my own behalf and on behalf of the members of the "B.C.G.A.," to associate myself with the toast, and to wish Sir David many years of health and happiness in which to enjoy the honour that has been conferred upon him and to aid the gas industry by his leadership.

Federation of Gas Employers.

Mr. J. H. Ellis, Chairman of the Plymouth and Stonehouse Gas Company: I am another objector, and a conscientious one at that, to inflicting myself upon you to-night. We should all have been content to leave this matter with the beautiful and scholarly speech which we have heard from the Chair. But it was represented to us that that might be misunderstood by our constituents; and with that meekness and humility which characterize the profession to which I once had the honour to belong, I yielded, as Mr. Cowen did, to the importunity of those who organized this gathering. [Laughter.] I commend this toast to you with whole-hearted enthusiasm; but I must recognize that I am deputed to speak on behalf of the Federation of Gas Employers, and so must confine myself to that branch of the many and beneficent activities of our guest which is associated with the relationship of employers and employees in the gas industry. I say, without the slightest fear of contradiction, that Sir David Milne-Watson's labour in this respect—apart altogether from his work in other spheres, which will be spoken of by eminent gentlemen who are qualified to do so—of itself earns our admiration and our gratitude. And it earns not merely the gratitude of the employers, but also the gratitude of the employees of the industry. Aye, and more than that, it earns the gratitude of the whole country. He is indeed a superficial observer of recent events who does not know that if the gas industry had not held together and carried on during the recent coal stoppage, the country would have starved. That is not one whit too high to put it. You cannot live on raw food; and speaking for the district I have the honour to represent, 90 p.ct. of the cooking is done by gas. Therefore I maintain that, but for the gas industry, the country would have starved. And why did the gas industry stand shoulder to shoulder in the time of the country's need? Because it was to the common interest of all engaged in it, and because goodwill obtained throughout. How did this goodwill come about? Was it accidental? No. It was the result of eight or nine years' sustained and systematic hard work. The Joint Industrial Council for the Gas Industry was formed to secure the largest possible measure of combined action between employers and workpeople, for the safeguarding and development of the industry, for the improvement of working conditions, and generally to promote the best interests of employers and workpeople. Had not our guest a share in the framing of this constitution, and has he not worked hard to carry out the lofty purpose therein set forth?

I have been privileged to sit with him at the Council board during these last trying years; and I say that it is owing to the pertinacity and the patience he has exhibited throughout, and to his work, day in and day out, night in and night out, to minimize difficulties and to bring us all together, that the gas industry served the country as it did in the crisis of last year. No doubt His Majesty's advisers have been told how it was the industry remained so solid, and that accounts for the very appropriate and the very gratifying way in which the country, or rather the King at the instance of his advisers, paid the gracious compliment which our guest has so worthily earned. If ever an honour was richly deserved, it is the honour that has been bestowed upon Sir David; and no one is more worthy to bear it.

I have spoken of the man's worth. What of the man? He is gifted, as you know, with an inquiring and a judicial mind. He is always sure of his facts. He weighs them well, and his decisons are based on sound reasoning. Not only so; he is a just man—some may think he errs on the side of generosity. It is a good fault. But he is more than that. He is a genial and fine negotiator; and when adversity threatens, I know of no man who faces it with greater fortitude or greater courage. He is a friend of us all. He has nobly done his part; and we hope he may long be spared to enjoy the distinction which has been conferred upon him—to the benefit of the great Company which he represents; to the benefit of the gas industry; and to the benefit of the country at large.

Gas Companies' Protection Association.

Sir J. Fortescue Flannery, Bart., President of the Gas Companies' Protection Association, and Chairman of the South Suburban Gas Company: A generation or two ago there was a mode of thought which was very generally accepted, and that was—"Whatever is, is right." That mode of thought has disappeared in favour of progressive scientific advancement and of social reformation; and we are here to-night because of this change. One survival of the old mode of thought to which I have referred is the dictum that "The King can do no wrong." We are here to-night because we believe that the King in one

instance has not only done no wrong, but has done conspicuously right. ["Hear, hear."] Lord Melbourne once said to his Cabinet: "It does not matter much what you say, so long as you all say the same thing." We are here now for the purpose of all of us saying the same thing. Some nine of us, including the Chairman, by the time we have finished, will have said the same thing, each of us in fresh and original language. Let me, however, say as briefly as I can that Sir David has been for many years conspicuously before not only the gas industry, but the public generally, as the head of one of the largest industrial establishments in any trade. He has been the friend, the promoter, the eloquent advocate of that great healer of industrial troubles, co-partnership between employer and employed. In his many activities, he has attracted to himself, by his winning personality, a large circle of friends who are represented here to-night by one of the largest gatherings that has ever been known to take place for the purpose of felicitating a brother upon his social advancement. Above all, he is a Scotsman; and this accounts for a great deal of what has been said, and will be said, in his favour.

This gathering, large as it is, is only a representative gathering after all. Not only do the nine speakers represent particular organizations, but everyone who sits round these dinner tables is himself a representative, because the invitations to attend were limited to those chosen to represent their fellows. So that we are speaking to-night not merely to you who are here, but through you to others numerous beyond counting. It is in their name that we are assembled here to-night, to wish well to a great leader of industry; to express our esteem, our admiration, and our appreciation of him; and to wish him long life, happiness, and prosperity, to enjoy the well-earned honour which the King has bestowed upon him.

Institution of Gas Engineers.

Mr. John Wilkinson, O.B.E., President of the Institution of Gas Engineers, and Engineer and Manager of the Nottingham Corporation Gas Department: We are making history to-night for those who will follow us in the administration and management of the gas industry; and the reason for this has been expressed by the previous speakers. We are here to do honour to our guest, Sir David Milne-Watson. I have been asked to say a few words on behalf of the gas engineers of this country, who are, I think I may say, the backbone of the industry. These engineers have been fully aware for many years past of Sir David's outstanding ability as an administrator; but it is only since the formation of the National Gas Council and the Federation of Gas Employers that we have been made aware of his exceptional energy and power as a leader, and a man who will not rest content until he has attained the highest possible efficiency, not only from the point of view of administration, but also from the chemical and engineering sides of our industry. That is the reason why gas engineers respect and admire him. During his direction of the two Associations just referred to, none have been closer than the gas engineers to Sir David in his march to victory. In all his negotiations with labour leaders, Government officials, and those connected with important industries affecting the finances of our own industry, our guest has at all times exercised a wise discretion, and brought to bear the experience he has gained as the controller of the largest gas undertaking in the world. Many gas engineers now present were greatly indebted to him for the assistance he rendered to them personally during the recent disastrous coal strike; and his cheery "Hold tight," even at the end of the trouble, will not soon be forgotten. I am not going to suggest that our guest may have found it necessary to follow the example of his historical ancestor, and clear out of his pathway to success some obstinate and offensive giant, by using the orthodox method of slinging stones [Laughter]; but I do say, with every confidence, that Sir David has been mightily successful in slinging stones which have combined together to build-up the magnificent Gas Light and Coke Company.

Many of our members are aware that our guest is a Master of Arts; and it would appear therefrom that there was a risk at one time of his straying into the Church, and becoming a Lord Bishop. There are also indications, as mentioned by our Chairman, that he had an eye on the law, and visions of the Woolsack. Finally, however, gas claimed him; and his judgment in entering the industry has proved to be well founded. I think that this function is a fitting climax to the valuable work he has done for the industry up to this point. No man can say what higher honours the future may be holding in store for him. It will also be noticed that our guest bears the name of the Patron Saint of Wales; hence the previous reference to the Church. But many of us have seen him fighting hard to carry an important point; and as on these occasions he was anything but a sick man, the "devil a saint was he."

True, however, to Scottish tradition, he seized the next best thing, and became a "Sir." A good deal of satisfaction can be derived in addressing a really good man as "Sir," because it should indicate, and does indicate in the majority of cases, that you are addressing a man who has given of his best to his country and his fellow men. That is how gas engineers feel with regard to our guest; and, in the name of the Institution of Gas Engineers, I heartily support the toast, and humbly express the wish that Sir David and Lady Milne-Watson may be blest in the future with the greatest blessing on this earth—good health.

National Gas Council.

Mr. Frank H. Jones, M.Inst.C.E.: As one of the Vice-Chairmen associated with Sir David on the National Gas Council, I realize the tremendous amount of work he does; but why does he do it? He is the head of the greatest of our particular undertakings—the biggest gas undertaking in the world. What does his Company get out of the National Gas Council? I suppose only the sort of feeling a big brother experiences when he has done a kindly action for his smaller brother. But what does the gas industry get out of Sir David? It gets much very hard work, and all the resources, financial and otherwise, of his great Company. That, I think, is something which we ought to be grateful for. But to-night it is Sir David of whom we think. On behalf of the National Gas Council, which represents most of the gas undertakings in this country, I offer Sir David the most sincere congratulations of every one connected with that body. I want you to understand that the congratulations of the National Gas Council are absolutely sincere. They are absolutely genuine; and no other body is going to give them more sincerely or more genuinely than the National Gas Council.

Society of British Gas Industries.

Mr. Frederick J. Gould, Chairman of Council of the Society of British Gas Industries: We are all proud to come here to-night to do honour to Sir David. The President of the Society of British Gas Industries very much regrets his inability to be with us to-night; but his absence is unavoidable. On behalf of the Society, I wish to associate myself most heartily with all the kind things that have been said. In 1924 Sir David was President of our Society; and we were very grateful to him for all that he did. He was responsible for that new atmosphere of understanding that came into being between us and kindred Associations represented here to-night. There is great necessity for the industry to stand together as one whole; and I venture to suggest that Sir David has shown us the way to do that.

Scottish Gas Undertakings.

Mr. J. W. Napier, of Alloa: I propose to speak as a Scotsman in praise of one who is a loyal Scot, and proud of his country. Scotland has given many eminent men to the sciences and arts; and there are names of Scotsmen that will ever be associated with the gas industry. It is an interesting circumstance that the two chief cities in Scotland have given two men who, each in his own generation, have been prominent in gas affairs. Glasgow, the city of industry, claimed Thomas Newbigging, the engineer—and, may I add, poet and writer? Edinburgh, the city of culture, of legal eminence and literary tradition, was the birthplace of David Milne-Watson, the scholar of the industry, and who might be titled the Professor of Gas Affairs—certainly in his own time the most learned statesman directing gas policy and legislation. Referring to the position of Sir David as President of the National Gas Council, it is not without interest to put on record at this time that before the national body came into existence, a Scottish Gas Council was active in being. This Council was constituted on precisely the same lines, and with the same aims and duties.

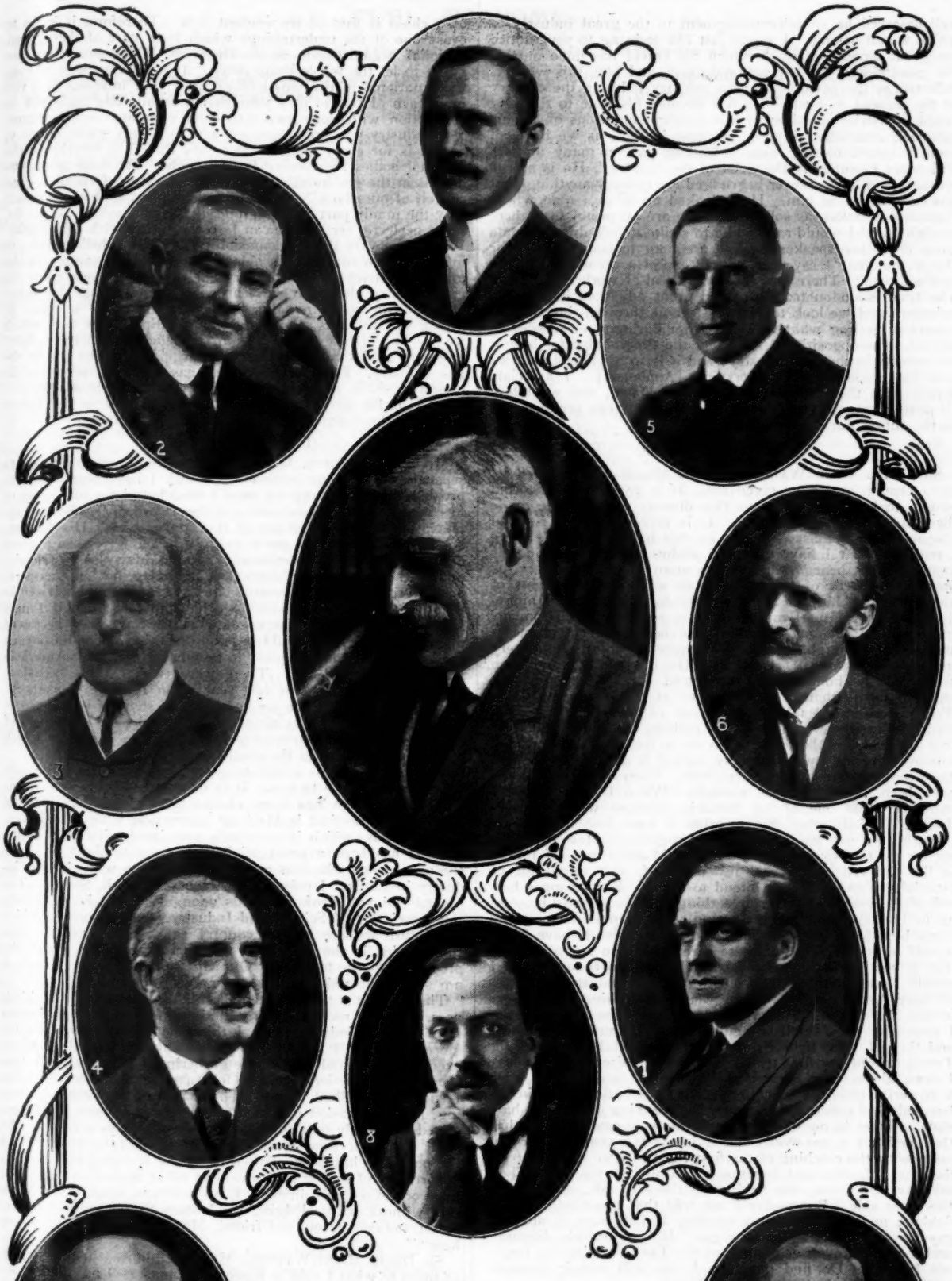
I desire to strike a personal note, and should like to take our guest away from the ebb and flow of London streets, from this flood of oratory and pageantry of praise, to Scotland, back to "Auld Reekie." To stand on the same spot at the east end of Princes Street where, in the judgment of Robert Louis Stevenson, the writer of great delight, a purist in literature, the beauty and wonder of the city of Edinburgh could best be viewed. To follow in the footsteps of Stevenson, and to see again the Pentland Hills, the hills of home. We go to the Fisher's Tryst up the old road by the Beech Hedge, and on a bright summer day, midst sunlight and shade, stand once again on the little bridge below the old Church of Glencorse, now a hallowed ruin. Afterwards to climb the steep slopes of fair Caerketton, and ascend to high Carnethy, and see the city under its blue mantle of smoke, with the silver Firth beyond. Our guest, in memory of his youthful days spent at school and university in Edinburgh, will think of the words of the poet:

> "Great City, every morning I
> See thy wild fringes in the sky,
> Soft-blurr'd with smoky grace;
> Each evening note the blazing sun;
> Each night I watch thy wondrous feast—
> Like some far city of the East."

In the name of all Scotsmen of the gas industry, I sincerely congratulate Sir David on the eminent honour conferred upon him.

Sir Arthur Duckham.

Sir Arthur Duckham, K.C.B.: I take it that I have been asked to address you as representing the rank and file of the gas industry, and the "man in the street." A great honour has been conferred upon our guest—an honour that is certainly well deserved by Sir David, for his great personal services, and



Chairman: Prof. Arthur Smithells, C.M.G., F.R.S., D.Sc.

1. Mr. J. E. Cowen (B.C.G.A.)
2. Mr. J. H. Ellis (Federation of Gas Employers)
3. Sir Fortescue Flannery (Gas Companies' Protection Association)
4. Mr. John Wilkinson (Institution of Gas Engineers)
5. Mr. F. J. Gould ("S.B.G.I.")
6. Mr. J. W. Napier (Scottish Gas Undertakings)
7. Sir Arthur Duckham
8. Mr. Percy Ashley, C.B. (Board of Trade)
9. Mr. Henry Woodall, Senior
10. Mr. W. E. Price, Hon. Secretary to Organizing Committee

[Mr. Frank H. Jones spoke for the National Gas Council; but we were unable to obtain his photograph.]

well deserved as an acknowledgment to the great industry to which we all belong. I would just like to bring to your notice the great amount of work which Sir David has done outside the gas industry for the national good, and how this work is reflected in the position the gas industry holds in the country at the present moment. He has devoted his time to the very vexed industrial questions of this country—questions of labour, material, and other things. He has, in fact, as we have all been delighted to see, taken a leading part in many matters which are essential to the good of the country. He is a true servant; and he has never begrudged the country anything that has been asked of him. He is looked up to as a man whose word can be taken as solid fact. We are all proud to be here to-night; and I would rather like to strike a little different note from the other speakers. We are here to congratulate Sir David; but may I say that we still expect a great deal of him in the future? There is a very great deal of work before him. The time is undoubtedly ripe for great advances in the gas industry; and we look to him to steer us through the troubled waters in getting what we want from Parliament—possibly in face of some opposition. As I say, the time is ripe for bigger movements in the gas industry; and it is to Sir David that we look for guidance and leadership. [Applause.] I associate myself with the congratulations to Sir David, and wish him all prosperity and the best of health. I feel I can promise him in the future our loyalty and support.

Sir David's Response.

Sir David Milne-Watson: I feel almost overwhelmed by the reception you have given me. It is extraordinarily kind of you to have asked me to this dinner, and to have made these speeches in my honour. It is very difficult to respond adequately to a toast proposed as this has been. One thing I realize is that I have the good wishes of all of you in this room ["Hear, hear."], and of very many outside it. I received literally hundreds of letters from all sorts and conditions of men, from the highest and from the humblest; and I appreciate them all. But I might say that probably those from my colleagues in the gas industry have been appreciated most; and perhaps I might add that I appreciate those of the very humblest in excess of all others. On the Saturday morning on which the honour was announced in the Press, it was reported to me that two of the men at one of our East-End Works were heard talking, and one of them said: "Well, we have got it now, Bill." It is perhaps the greatest honour that has ever been bestowed upon me to feel that the workmen employed by my own Company regard it as an honour that has been conferred upon themselves. Many flattering things have been said about me to-night. When I was young, I remember that one of my favourite mottoes was: "Know thyself." Well, after the speeches I have just listened to, I frankly do not know myself. [Laughter.] However, it is not for me to dispute what you have said about me. If I were to lift the veil and reveal my real self, you might all be astonished; and I do not intend to do so. But I cannot help reflecting what a very strange thing fate is. I was brought up to the law, and had a leaning towards politics; and had it not been for a happy accident, no doubt I should have found myself in one or other of these careers. I can say absolutely that at the beginning of my career I had no thought that I should have anything to do with the gas industry. It was all very accidental; but there were not lacking early signs in my life that I must have been destined for this industry. I remember as a small boy going with my family to Peebles, and there I went fishing, and in the beautiful waters of the Tweed caught my first trout. On the opposite bank to where I was, there was situated a gas-works, from which arose a powerful smell of spent lime; and that curious coincidence has endeared gas to me in a way that nothing else would have done. There is no smell on earth more pleasant to me than the smell of a gas-works, as it is always associated in my mind with the catching of my first trout. After that I entered the gas industry, and became an enthusiast for gas. These are my two loves; my fishing on the one side, and gas on the other side. But to-day I am told that gas-works destroy fishing; and I do not know whether I shall have to abandon gas for fishing or fishing for gas. It is a terrible dilemma, and I appeal to you gentlemen of the Tar Committee to rescue me from it. Do find out how I can still remain constant to these two early loves! [Laughter.]

Now, to be serious. Looking back (say) twenty years, we find that each undertaking then more or less went its own way. There was no British Commercial Gas Association, no National Gas Council, no Federation of Gas Employers. It is true there was an Institution of Gas Engineers nobly looking after the scientific side of things, and there were other bodies engaged in sectional activities. But there were no national organizations representing this great industry with which we are all connected. To-day, we have the bodies I have named and others who are fighting the industry's battle. Napoleon said: "God is on the side of the big battalions." We are all familiar with the saying: "Unity is strength." We have got that now. We have got unity, we have got strength; but though we are no longer disunited, there arises even greater responsibility than there was before, because I would remind you that the strength of a chain is that of its weakest link. Therefore, it is up to every one of the undertakings which form part of these great national organizations to do their bit. Otherwise they are going to let the whole thing down. It is all very well to have these national institutions looking after your interests, but you have each of you to play your part manfully and rightfully in connection with your own particular company or committee. The industry you are connected with is a very great industry, and it is for every one of you to see that it is worthy of the national bodies represented here to-night. We have great traditions in the gas industry, and I would say: "Give us a good conceit of ourselves." It is absolutely essential that we should play the manly part and be proud of our profession. If we do, I am perfectly certain we can face the future with equanimity. We have a very great responsibility, because I believe the gas industry is in many ways able to show a fine example to the other industries in this country. There are lessons from the gas industry that may be learned with advantage by many others. Our co-partnership, pension, and welfare schemes go a long way towards solving the industrial problems with which we are face to face to-day. I am very glad to be here to-night, and very glad that I have spent a large part of my life in the gas industry. I am proud of the gas industry—proud of its present position, and proud of its past—and I am absolutely persuaded of the great rôle it is destined to play in the future industrial development of this country. [Applause.]

The Board of Trade.

Mr. Percy Ashley, C.B.: It would be improper for us to separate without one more toast, which I have been asked to propose. Before doing so, may I be allowed for one moment to express, as a representative of the Board of Trade, our appreciation and our welcome of the honour which His Majesty has bestowed upon our guest to-night? We have seen a great deal of Sir David—sometimes as a critic, always as a friend—and we have learned to appreciate his value, not only as a representative of your industry, but as a guide and adviser in many of the problems which we have to face; and if I may add just one word to the encomia which have been bestowed upon him to-night, I would say that one thing which has struck me is his sanity and inability to be what I think our American friends call "rattled." There were two or three occasions during the crisis in May last year when I had to consult Sir David on matters which seemed likely to some of us to become very serious; and I was always impressed by the steadiness of his views and the superiority of his judgment—judgment which was amply justified in the result.

My present task is a very easy one, because I am quite sure it will be welcome to you. It is to propose the health of our Chairman, which has three claims to our consideration and gratitude. The first is his long connection with the University of Leeds, which is peculiarly associated with your industry. It has been a great privilege for me to-night to sit by the side of one who was associated long ago with the gas industry in Leeds. I refer to Mr. Henry Woodall, Senior. The second claim of Prof. Smithells upon us is that he represents the association of Science and Industry—that science on which the future welfare of this country so greatly depends. The third claim is the delightful speech in which he began the proposing of the toast of "Our Guest." All these reasons, I am sure, will make the toast very welcome.

The Chairman: I am deeply grateful to you for your kindness. I have received in my lifetime many high compliments from the gas industry; but I think nothing has touched me more than that I should have been chosen to preside to-night over this great and memorable gathering. I do not think that ever in my experience have I felt more at a loss to say what I should have liked to say. This has been no formal gathering, but an occasion in which our hearts have been deeply engaged—so deeply that our heads have suffered as a result. We shall all think how much better we might have performed the part that has been allotted to us. I am glad to have this opportunity of saying how much we all of us owe to those who have organized this dinner. I am sure you would not wish to part without acknowledging the labours that have been undertaken, notably by our old friend, Mr. W. E. Price. ["Hear, hear."].

Sir David Milne-Watson: May I be allowed just a word in addition to what I said in reply to the toast? I am glad to see so many comrades in many hard fights round the table here to-night, and while I appreciate the presence of every one of you, I should like to refer particularly to Mr. Henry Woodall, Senior; he is, I suppose, now the doyen of the gas industry. He is a member of a family known and honoured all over the British Empire and elsewhere for the work that it has done on behalf of the gas industry. I am proud to think that Mr. Henry Woodall did me the honour to travel all the way from Wales so as to be present at this dinner, and I would like him to know how much I appreciate it. I also wish to thank Mr. Napier for his kind remarks about the country I love so well, and about the Pentland Hills in particular, where as a boy I have spent so many happy days.

The proceedings were brought to a close with the singing of "Auld Lang Syne."

FUEL ECONOMY.

By E. W. Smith, D.Sc., F.I.C., of the Research Section of the Woodall-Duckham Companies.

[Extracts from a Paper read on March 3 before the Co-ordinating Committee representing the Staffordshire Iron and Steel Institute, the Birmingham Metallurgical Society (Inc.), and the Birmingham Local Section of the Institute of Metals.]

Dr. Smith observed that he was discussing the subject of fuel economy in the metallurgical industry at a combined meeting of three bodies interested in different branches of the metallurgical industry. Presumably, the primary objects of this combination were to eliminate overlapping, and to form a common pool of information useful to all three branches of a most important industry. There are, he said, too many societies, and there is too much overlapping in technical work and too little pooling of common information.

A short time ago I propounded a scheme for the inauguration of a Federal Fuel Council which should consist of representatives from all societies and organizations interested in various branches of fuel. This suggestion has met with a wholehearted response, and I hope that the metallurgical societies will consider it advisable to be represented on the Fuel Federal Council, should this eventually be formed.

Fuel economy depends largely on research, collaboration, better organization, and a greater dessemination of already existing valuable technical information among the actual operators and users of equipment employing fuel. There is an enormous amount of information and experience available in individual associations and industries which is not available to, or known of by, the rest. It would be of national advantage if greater collaboration were to be organized. I would like to see in every community some organization or body that had for its main function the keeping of a close watch on the interests of fuel users. It is not merely a question of keeping the average price down, but rather one of being in a position to make intelligent and justifiable representations as regards organization connected with distribution and application of various types of available fuels.

Gas for Industrial Work.

Let us take one instance of what might be done in a large industrial area. At present town gas cannot be sold to the industrial user in most areas except at a price which is little different from the price charged to the small domestic user. This is due to inherent conditions, regulated by Act of Parliament. Areas, however, vary. In one case the greatest differentiation that can take place, whatever the gas consumption, may be 5 p.ct.; in another area it may be as high as 50 p.ct. for very large consumptions. Such conditions are of little use to the ordinary industrial user; and the great stumbling block in the past has been the fallacious argument that the domestic user should not pay any higher price for his gas than the industrial user. Most gas undertakings are convinced that, if a big industrial load could be created, the average cost of gas production would be much reduced. The cost of supplying gas to the industrial user is much lower than the cost of supplying gas to the domestic user; and if a very considerable differentiation were made, not only for very large quantities, but more particularly for a constant load, it is inevitable that eventually the domestic user would directly pay less for his gas.

But there is another side to the question. The domestic user depends for his economic future on the general prosperity of the community. It is no use his getting gas at a comparatively low price if he is out of a job, and cannot pay for it in any case. Though fuel is only one of the factors in the cost of production in industry, it is one of the prime factors; and if cheap fuel is available, it helps prosperity in industry—there is more work and more employment, and the domestic user is in a better position to pay the domestic rates for gas than he would be if trade were bad. There needs to be a strong industrial backing to the proposals that the industrial user shall obtain his fuel at a much lower cost; and the management of gas undertakings would, in most cases, appreciate support in this direction.

Of course, such Fuel Vigilance Committees would deal not only with gas. It will probably be found that from every point of view a better service is obtainable from gas undertakings than from any other fuel providers. Coal and coke are both worthy of the fullest consideration, and standardization is essential with both materials.

Gas Furnaces.

Some time ago a series of tests was arranged in connection with gas furnaces, comparing standard furnaces of the low-pressure type with improved types of furnaces, regenerative and recuperative. In the old type of low-pressure and non-recuperative furnace, the actual efficiency did not reach more than 5 p.ct. The losses due to poor insulation, furnace doors, and waste gases accounted for the 95 p.ct.

The differences in the thermal efficiencies obtainable with various types of furnace with different kinds of fuel at varying temperatures are not all entirely due to the different kinds of operation employed, or to the varying temperatures. The major differences are due to a more scientific design of furnace.

High-temperature furnaces of the non-recuperative and non-regenerative type, if large enough, can be considerably increased in efficiency by the employment of waste-heat boilers. As a generalization, it is safe to say that, if 100 heat units can be saved by recuperation or regeneration, 200 heat units can be saved by the use of waste-heat boilers. I do not want it to be understood, however, that in all cases it is preferable to dispense with recuperative or regenerative furnaces in favour of the adoption of waste-heat boilers. There are cases where this would not be advisable, particularly in the use of producer gas, where higher temperatures are required than can normally be obtained without a high pre-heat of the air.

Surface Combustion.

A system which has made great progress in the United States, and also in this country, is that which depends on the theoretical proportioning of air and gas, their proper mixture, and their combustion under correct conditions. By this means maximum flame temperatures are available, and furnace temperatures are merely a question of quantity of gas burnt. As an example of what can be done in this respect, I would mention to you the success that has been attained in the printing trade in London in the heating of stereotype melting pots. The essentials of this business are that stereotype shall be melted, and be under control, in large quantities in a very short time. Three years ago over 80 p.ct. of this work was done with solid fuel. At the present time all London newspapers are employing the surface combustion system, and in some cases the quantity of metal melted over a period of 4 to 5 hours amounts to over 400 lbs. per minute per furnace. The work is being done cheaper than with solid fuel, the metal is more uniform, cracked pots are almost unknown, and the ground space saved is considerable. There is no doubt that, if gaseous fuel can be obtained at a reasonable cost, the possibilities for improved production, as regards both speed and quality, are very great.

Heat Insulation.

Recent years have shown marked advance in the preparation of materials suitable for the prevention of heat loss through furnace walls. In most of the furnaces used to-day, heat insulation of some sort or other is provided; but the efficiency of the insulating medium varies considerably. In deciding on the type of insulating material to be used, one or two factors must be kept in mind. First, the temperature to which the heat-insulating material is to be subjected must be considered. The heat-insulating properties of certain materials rapidly deteriorate above critical temperatures. Secondly, in determining the comparative cost of a number of heat-insulating materials, the thickness of the material required to conserve a given amount of heat must be considered. Thus, a heat-insulating material 75 p.ct. more expensive may only require half the thickness of another material, in which case the more highly priced material is the cheaper to use.

Aluminium Paint.

One of the less known methods of saving fuel is by painting furnaces and ironwork with aluminium paint. Heat is lost from the external surface of a furnace in two ways—convection and radiation. Convection loss is roughly proportional to the temperature difference between the surrounding air and the furnace surface, but the loss due to radiation is proportional to the fourth power of the absolute temperature of the surface. Therefore, the higher the surface temperature, the greater is the importance of radiation loss. Furnaces with iron or brick surfaces have a relatively high emissivity or radiating power, while aluminium paint has a very low emissivity. It therefore pays to paint such surfaces with a suitably-prepared aluminium paint. Higher operating temperatures can be obtained with the same fuel or power consumption. J. D. Edwards, in "Chemical and Metallurgical Engineering," September, 1926, gives an interesting account of the saving which can result.

To show the effectiveness of aluminium paint, a series of tests was made upon an electric furnace of the laboratory type used for heating tubes in combustion analyses. As originally made, it was painted black with white composition-board ends. When operated in this condition, it was found by a number of observations, sufficient to determine average performance, that with a power input of about 630 watts (at 110 volts) the centre of the furnace reached a temperature of 954° C. (1749° Fahr.). After applying a coat of aluminium paint to the exterior, it was found that with exactly the same power input the temperature reached was just 22° C. (40° Fahr.) higher—namely, 976° C. (1789° Fahr.). Obviously the original temperature

could have been maintained with a smaller power input with the aluminium painted surface. With furnaces operating at a higher temperature, the gain would be even greater.

An additional important advantage of the aluminium paint on furnaces is that the operating conditions are more comfortable for the workmen, since they receive less heat by radiation. The surface of the aluminium painted furnace is usually hotter than if it were not so painted, due to what is equivalent to damming up the heat on the surface of the furnace. Consequently convection losses are slightly increased. One of the advantages of painting furnaces with aluminium paint is that this material does not discolour in the presence of hydrogen sulphide. In any case, discoloration should not affect the efficiency of aluminium paint as an insulator.

COMPLETE GASIFICATION IN SWITZERLAND.

The Rincker Plant.

[From a Report in the "Journal des Usines à Gaz" of a Paper by M. Jaccard, read at the Annual Meeting of the Swiss Gas Society, and published in the "Bulletin Mensuel de la Société Suisse."]

[A correspondent writing to us regarding this report, says the statements can hardly be considered fair, taking into account the position of the contracting Company at that time, and should not be regarded as indicative of average working.]

The gas undertaking at Chaux-de-Fonds, during 1923, was faced with a heavy accumulation of coke; and the management, impressed with the insistence of its advocates, decided to go in for complete gasification. At that time, the choice lay between the Strache and the Rincker processes. Of these, the former had been functioning for some months at Gratz, Weiner Neustadt, and at Chemnitz, and also in certain Italian towns where inferior coals were treated. The Rincker process had been experimented with for some years in Utrecht; and it appeared to offer certain advantages—namely, the possibility of carburetting the gas with oil or even tar, the published results from Ruhr coals (which were easy to obtain), and the particularly favourable gas yields which were guaranteed.

Guaranteed and Test Results.

As the latter advantage was the one which decided the undertakers to instal the Rincker plant, the author mentions in his paper the guarantee clauses included in the agreement signed by the Contractors, "which bore witness to the blind confidence placed in the future of complete gasification and to the hopes which it inspired." The manufacturers guaranteed the following figures for yields, reduced to 760 mm. Hg. and 15° C.

1. *Complete Gasification:* 500 cub.m. [17,660 c.ft.] of gas per hour, or 10,000 cub.m. [353,100 c.ft.] per 24 hours (making allowance for clinkering time). Yield per metric ton of coal (without dust 8 p.ct. ash, and 35 p.ct. max. volatiles) 1500 cub.m. of gas of 3100 cal. gross [53,800 c.ft. of 350 B.Th.U. per ton].
2. *Blue Water Gas:* 500 cub.m. per hour, or 10,000 cub.m. per 24 hours. Yield per ton of air-dried coke (12 p.ct. ash) 1670 cub.m. of 2500 cal. gas [59,900 c.ft. of 280 B.Th.U. per ton].
3. *Carburetted Water Gas:* 25 kg. of gas oil (13 p.ct. of hydrogen) and 45 kg. of coke (dry and 12 p.ct. ash) for 100 cub.m. of 4200 cal. gas [15·6 lbs. and 28·1 lbs. respectively per 1000 c.ft. of 472 B.Th.U.].

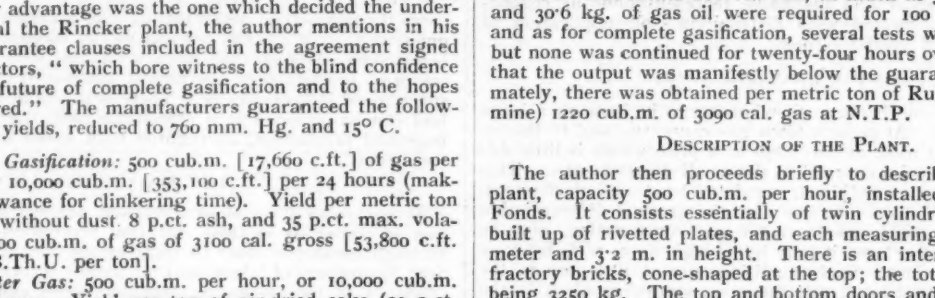
Three 24-hour tests were carried out, after the plant had been running for a month, in order to check the above-mentioned figures. It had been arranged that if one or another of the guaranteed figures was not attained, the contracting firm should abandon, on the simple requisition of the undertaking, one-sixth of the forfeit. Further, if the complete gasification of Sarre coals did not give a yield superior to 1300 cub.m. of 3100 cal. gas [46,500 c.ft. of 350 B.Th.U. per ton], the Contractors should take back the whole of the installation, and immediately make good any expenses incurred.

As far as the complete gasification test was concerned, the guarantee figures were not reached. The Engineer was not even able to obtain the 1300 cub.m. minimum provided for; and, the Contractors having sold the bear's skin before shooting him, the undertaking could have had the whole plant cleared-out. After such brilliant promises, the disillusionment was highly disappointing, especially as other reasons existed for dissatisfaction. The plant was ordered in 1922, and it should have been at work in June, 1923; but it was March, 1924, before it was ready. The Contractors had insufficient qualified personnel to look into the matter, and various delays were granted, which brought them up to July, 1925. Meanwhile, the contracting Company had gone into liquidation!

The blue water gas test, as a matter of fact, proved satisfactory, for 1562 cub.m. of 2705 cal. gas per tonne were obtained—4,225,000 calories, against the guaranteed 4,175,000 calories. But in the C.W.G. run, as much as 53·1 kg. of coke and 30·6 kg. of gas oil were required for 100 cub.m. of gas; and as for complete gasification, several tests were carried out, but none was continued for twenty-four hours owing to the fact that the output was manifestly below the guarantee. Approximately, there was obtained per metric ton of Ruhr coal (Wendel mine) 1220 cub.m. of 3090 cal. gas at N.T.P.

Description of the Plant.

The author then proceeds briefly to describe the Rincker plant, capacity 500 cub.m. per hour, installed at Chaux-de-Fonds. It consists essentially of twin cylindrical generators, built up of rivetted plates, and each measuring 2·3 m. in diameter and 3·2 m. in height. There is an interior shell of refractory bricks, cone-shaped at the top; the total fuel capacity being 3250 kg. The top and bottom doors and the steam jets are shown in the drawing. The grate, which is 45 cm. above the jet, is 1 m. in diameter, being built up of rectangular 90 by 40 mm. bars, 40 mm. apart. Air is supplied by a Sulzer high-pressure fan, with a capacity of 1·65 cub.m. per second at a pressure of 600 mm. The blast is led under each grate through a 300 mm. pipe. Air can be admitted to the upper part of either generator through a 200 mm. pipe. The blast gases can be evacuated direct to the chimneys, or else through a tubular boiler generating steam at 8 atms. Pipes lagged with refractory join the top of the generators together, and each of them to the common hydraulic main, which measures 2 by 1·25 m.; the off-take pipes being led out of the space beneath the grate. The gas oil, under pressure from a steam-driven plant, is admitted, after being metered, by way of the vertical pivot on which the upper lid of each generator is mounted. Thence the oil passes to a spray which feeds it on to the incandescent coke. Rectangular openings are provided for the introduction of false bars during clinkering, which usually has



THE RINCKER PLANT.

to be carried out after eight or twelve hours' run. The seatings which close these openings are protected by refractory cement, which must be renewed after each clinkering. It will be understood that various valves and other parts are omitted from the drawing.

The plant may appear complicated; but actually it is easy to work—one man alone could, in fact, run it in emergency.

Mode of Working.

In complete gasification, the process consists of making water gas in each of the two generators alternately, and passing it through the other, in which is a bed of coal which is carbonized at low temperature by the sensible heat of the water gas. When, for instance, the contents of producer 1 are completely coked, there is introduced into producer 2 a charge of coal to replace the residue of an earlier gasification—this coal being fed on to the remaining coke which is still at a temperature of 700° to 800° C. First of all, the air blast is turned on under the grate of producer 1; and in two minutes raises the temperature of the coke to 1200° to 1300° C.; the blow gases passing out through the waste-heat boiler. Then steam at 5 atms. is injected under producer 1; and the resulting water gas is led into the upper part of producer 2, and passes down through the bed of coal, and partially distils it. During this stage, volatiles from the coal enrich the water gas, and are fixed by their passage through the coke, which remains at a dull red heat under the coal. After five or six minutes, gas making is stopped for a further blow; and thus the process continues until the coal in producer 2 is fully coked. Thereupon the producers are reversed.

In making blue water gas, one proceeds with alternate blows and runs as before, except that the two producers are blown in parallel, and gas making is carried out in series, with reversal. This method of working, which ensures a fuel bed varying from run to run, gives ideal conditions for both CO_2 formation during the blow and CO formation during the run. This is borne out in practice, as the following analysis shows:

CO_2	1·8 p.ct.
O_2	0·6 ,,
CO	44·6 ,,
H_2	49·3 ,,
N_2	3·7 ,,
	100·0
C.V.	2840 calories [318 B.Th.U.]
Density	0·552

For carburetted water gas manufacture, producer 1 is blown to a high temperature; but the blast gases, before evacuation, are led through the coke in producer 2, and raise it to a temperature suitable for cracking the oil; some secondary air being admitted to the blast gases through the valve connecting into the upper cross main. Thereafter, steam is injected under producer 1, and the water gas is led into producer 2 coincidently with the oil spray. After five or six minutes' run, the oil is cut off, and then the steam; and a fresh blow is carried out—either producer being carburetted, according to the nature and the quantity of oil used.

It should be said that the carburetting process is rendered delicate by the necessity for working at a temperature of about 1000° C. Below this point, simple vaporizing and recondensation of the oil in the hydraulic main is liable to take place; while above 1000° C., too complete cracking of the oil occurs and the pipes are carboned up. During test runs, a good yield of 4200 cal. [470 B.Th.U.] gas was obtained for some hours, but then the value fell to 3400 cal. [381 B.Th.U.], although the oil feed remained steady—and deposits were found in all the pipes.

High-Volatile Coals Used.

In further reference to complete gasification, the author says that the chief difficulty was met in dealing with high-volatile coals, which are the easiest for them to procure. When treating these coals without blending, it was found that insufficient water gas to coke the coal was forthcoming from the one generator, without recharging it in the other. When the coke bed was ready for renewal, the first-stage generator invariably contained semi-coke rich in volatiles; and reversal of the plant and the commencement of blowing produced clouds of black smoke and wastage through the stackpipe. The only way to avoid this was to add fresh coke to the spent in the producer, carry on steaming the latter, and so complete the carbonization of the coal.

Coal and Coke Blending.

Concluding the article, M. Jaccard says that complete gasification with the Rincker plant is possible, and can be practised with complete security; but that the results obtained were far from those promised—not more than 1200 cub.m. of gas of 3100 calories [43,040 c.ft. of 350 B.Th.U.] was made per metric ton. The majority of coals cannot be used unless they are blended with a considerable amount of coke. Alternatively, intermittent operation may be adopted; but this entails a 15 to 20 p.ct. reduction in output. For water gas production, the plant is most satisfactory.

MIDLAND JUNIOR GAS ASSOCIATION.

Visit to the Stanton Iron Works.

On Saturday, March 5, about sixty members of the Association visited the Stanton Ironworks Company, Ltd., near Nottingham. On arrival at Derby, they were conveyed to the works, where they were entertained at luncheon by the firm.

In welcoming the visitors, Mr. E. J. Fox, M.I.Mech.E. (Managing Director), said that in the short time at their disposal he wished them to see the centrifugal process of pipe making. This was in only a small portion of their works, employing 500 to 600 men; but he thought the process would prove interesting. They were standardizing and stocking "spun" pipes of 4-in. to 15-in. diameter, and could make larger diameters; but he did not think it would pay them to do so, as they wished to keep the plant occupied in turning-out pipes on mass-production lines. He referred to the fact that there was still a certain amount of prejudice among engineers, owing to the process being a new one. The "spun" pipe was manufactured approximately 25 p.ct. lighter than the cast-iron pipe; but as the tensile strength of the spun metal was at least 70 p.ct. higher than that of cast-iron, the resultant pipe was, notwithstanding its being thinner and lighter, still 30 to 40 p.ct. stronger—a most important factor. In spite, however, of this prejudice, the new pipe was being accepted by engineers throughout the country. The total orders received exceeded 1,000,000 pipes; the repeat orders alone representing a matter of over 800,000 pipes.

Mr. C. F. Tooby (President), in reply, expressed the thanks of the members for the hospitality afforded them. He had for a long time wished to see the spun process of casting pipes—more particularly since the interesting lecture given to the Association some months ago by Mr. Wilson, the Foundry Manager. The process was so different from the old method that it must have entailed a great deal of thought, and no small amount of courage, to develop the enterprise.

Mr. H. R. Hems seconded the vote of thanks, which was carried with acclamation.

The following is a brief description of the manufacture of Stanton Delavaud spun iron pipes:

Overhead bunkers, each capable of containing 60 tons of pig iron, coal, and coke, discharge their contents, in carefully measured quantities according to analysis, into an electrically controlled travelling carriage, on which is fitted a skip. The skip having been withdrawn from the carriage, it is taken to an automatic hoist, hydraulically operated, and the contents discharged into a cupola. The cupola, in turn, discharges the molten metal into ladles, which conveys it by means of a telpher overhead runway to the centrifugal machine by which the pipes are produced.

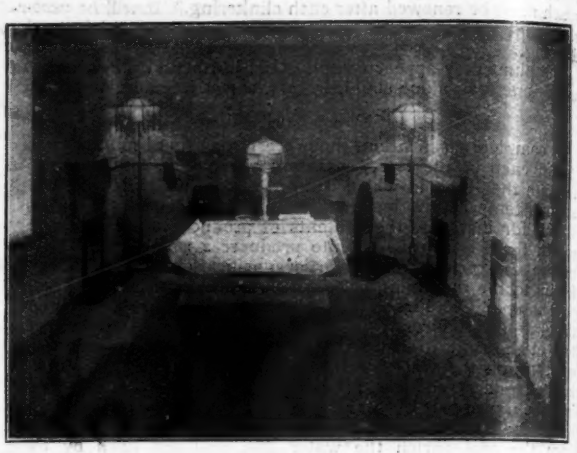
The centrifugal pipe-moulding machine consists of a metal casing in which a water-cooled steel mould is rotated by water power. The molten metal is introduced into the mould by means of a cantilever trough or spout. The only core used in the entire process is that which shapes the inside of the socket; the rotating mould being shaped to form the outside of the socket.

As the metal flows from the trough or spout, the casing containing the mould is traversed, thus causing the iron to line the inside of the mould throughout its entire length. The rotation of the mould causes the metal to line the mould to an even thickness; the resultant iron being free from gases, and of very dense structure. When solidified, the pipe is withdrawn and passed through a specially constructed gas-fired annealing furnace, where again it is rotated, thereby not only ensuring the complete annealing of the external surface, but preserving the concentric form. Upon withdrawal from the furnace, the pipe is cleaned and coated inside and outside, or outside only, according to requirements.

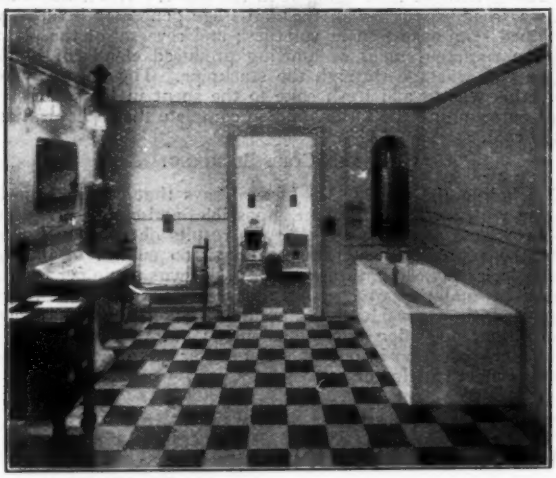
Removal and Recovery of Phenols from Ammonium Sulphate Still Effluents.—At a meeting of the Birmingham Section of the Society of Chemical Industry, on March 22, Mr. D. W. Parkes, B.A., B.Sc., will read a paper on the above subject. He will deal with: (1) The problem of the disposal of spent ammonia liquor; objections to present methods and some suggested improvements. (2) The removal and recovery of tar acids by means of activated carbon. (*a*) Description of the method in general terms; (*b*) an account of some batch experiments; (*c*) semi-continuous and continuous experiments; (*d*) the activated carbon; and (*e*) the effect of activated carbon on other constituents of the waste liquor.

GAS IN THE IDEAL HOME—SOME EXAMPLES FROM OLYMPIA.

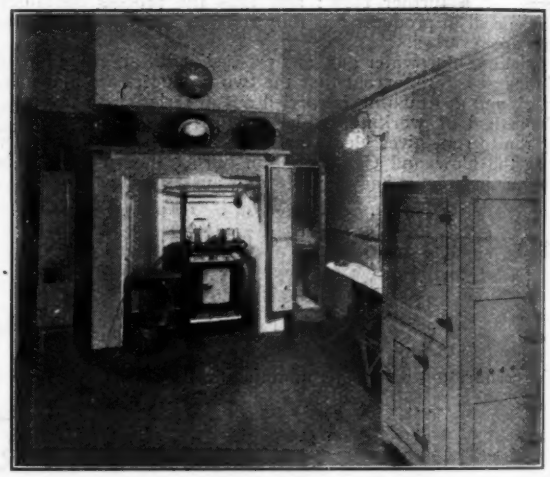
The full description of the gas features of the eleventh "Daily Mail" Ideal Home Exhibition now running at Olympia, which was published on pp. 582-85 of last week's issue of the "JOURNAL," is here supplemented by some photographs of the joint exhibit of the London and District Gas Companies. This, it will be recalled, takes the form of a complete showroom in miniature. There are six rooms, excellently arranged, in which are to be found samples of the best gas appliances for lighting, heating, and cooking in both large and small homes. The remaining photograph is a view of the dining room in the "all-gas" prize house in the "Village of New Ideas" that has been so efficiently equipped by the South Metropolitan Gas Company with a complete "Metro" gas service for lighting, heating, cooking, and hot water supply. It shows the tasteful fireplace containing a "Metro-Log" gas fire, controlled by a standard tap; the supply to the fire being buried in the hearth. The "Metro-Log" fire, which has proved so popular among consumers, is to be seen also in various other parts of the exhibition.



Built-In Fires, Hinged to show Flues.



Bathroom, with Geyser in Recess. Coke Boilers in Room Beyond.



A Well-Appointed Gas Kitchen, with Gas Boiler, Clothes Airer, and "Electrolux" Gas-Operated Refrigerator.

ARTISTIC LIGHTING AND HEATING APPLIANCES.

"METRO" GAS SERVICE IN THE "VILLAGE OF NEW IDEAS."
Switch-controlled lighting and a "Metro-Log" fire.

CARBONIZATION OF PARTICLES OF COAL.*

By H. E. Newall and F. S. Sinnatt.

This is the third paper dealing with the phenomena which occur during the carbonization of coal in the form of fine particles. The method has been examined from a number of aspects, since it appears to provide means of investigating the behaviour of coal under the influence of controlled and definite increments of heat.

At low temperatures profound changes occur, which have an influence upon the properties and structure of the products obtained when the coal is exposed to a higher temperature. Further, when masses of coal are used, the relative rates at which the different zones of coal attain different temperatures play an important part in deciding the quality of the products formed.

In previous experiments, particles of coal of 60-90 mesh I.M.M. were allowed to fall through a tube 1 in. in diameter, of which a length of 18 in. could be maintained at any desired temperature. The present paper describes experiments designed (*a*) to ascertain the time of exposure required at a definite temperature to modify and destroy the caking properties of coal; (*b*) to determine whether the destruction of caking properties could be associated more definitely with the evolution of volatile matter, and if the two phenomena occurred in a uniform manner.

In the first series of experiments the nitrogen-filled furnace tube was maintained at 400° C.; particles of coal of 60-90 mesh being allowed to fall through the tube in a dispersed cloud. The solid product obtained was cooled in an atmosphere of nitrogen, and was then reheated until the caking properties were destroyed. The treated product was tested for volatile matter and agglutinating value.

Pronounced changes in the rate of destruction of the caking properties could not be detected; the inference being that the constituents which confer caking properties upon coal undergo modification or decomposition in a uniform and gradual manner. This modification is accompanied by the evolution of volatile matter and a decrease of caking properties. Figures (see table) show that complete loss of caking properties is associated with the evolution of different amounts of volatile matter in the case of the three coals tested.

The same three coals were examined under similar experimental conditions with the tube maintained at 600° C.; the volatile matter evolved per unit loss of agglutinating value being, coal A 1·9 p.ct., coal B 1·5 p.ct., and coal C 4·9 p.ct. At 600° C. the loss of caking power is very rapid; a duration

	Temperature, 400° C.		Loss of Volatile Matter.
	Agglutinating Value.	Loss of Volatile Matter.	Agglutinating Value.
		P.Ct.	
Coal A	10·0	6·6	0·66
Coal B	8·5	3·9	0·46
Coal C	4·0	6·1	1·52

of heating of approximately 3 seconds being sufficient to destroy it completely. The particles after carbonization were swollen, rounded, and possessed lustrous surfaces. In the case of the coal examined, the periods of treatment for complete destruction of caking properties at 600° C. and 400° C. are of the order of 1 and 7.

The information available upon the relative rates at which coals decompose is incomplete, but the following figures give a rough comparison. The loss of volatile matter is expressed as a percentage of the original volatile matter in the coal. In each case the product obtained after three treatments was non-caking.

Temp. of Tube, 600° C.; Particles 60 90 Mesh I.M.M.

Times of Heating of Coal.	P.Ct. of Original Volatile Matter Remaining in Product.			
	Coal A.	B.	C.	D.
0	100	100	100	100
1	70	78	88	84
2	55	67	67	71
3	48	61	51	54

Analyses of Original Coals, P.Ct.

	A.	B.	C.	D.
Moisture	2·2	1·3	6·5	1·7
Volatile matter	37·0	33·3	40·5	38·8
Ash	1·5	2·8	2·6	2·7
Agglutinating value	10·0	8·5	4·0	14·5

With increased size of coal particles—viz., 10-30 mesh—very little decomposition occurred at 400° C. in the length of heated tube used (18 in.). There was a slight loss of volatile matter, but no decrease in caking power could be detected, after fourteen exposures of the coal to the heated zone. Similarly, at 600° C., after thirteen treatments, the caking properties were unimpaired, and little decomposition had taken place.

* "Fuel in Science and Practice," 1927, p. 118.

SOCIETY OF CHEMICAL INDUSTRY.

Joint Meeting of the Yorkshire Section and the Fuel Section, Feb. 28.

(*Concluded from p.* 603.)

THE BEHAVIOUR OF CARBONIZED FUELS IN THE OPEN FIRE-GRATE.

By Margaret F. Bligh, B.Sc. (London and Leeds), and H. J. Hodsman, M.B.E., M.Sc., F.I.C.

[Extract.]

Many workers have investigated various properties of coke, but few have recorded quantitative observations on cokes burning in the open domestic grates. The well-known experiments of Margaret Fishenden have supplied the most reliable information available. Here at Leeds the properties of cokes have been under examination for many years, and it appeared desirable that laboratory studies should be supported by quantitative observations on the behaviour of coke in a firegrate. The work, which has covered a few typical fuels, includes a sample of West Yorkshire house coal.

It was desired to observe the behaviour of the cokes under conditions definitely favourable, for it must be remembered that the "modern grate," as it is called, was designed for the burning of coal. The late Dr. Pridgin Teale, of Leeds, who was probably the pioneer in introducing this type of household grate, only claimed its suitability for burning "good Yorkshire coal." In a time when few saw any objection to the use of raw coal, the barless pattern of firegrate became fashionable, and now may be called standard practice.

The fact that coal can be so easily burned in so simple an appliance is probably due more to the excellence of the house coal available in this country than to any special merit of the modern grate. Such a construction is not well designed for carbonized fuels; and the fashion for installing such grates, suitable for a narrow range of fuels, has interposed difficulties in the way of popularizing carbonized fuels. In pressing the claims of smokeless fuels, it is desirable to bear in mind the differences in the mode of combustion of coal and cokes.

When coal in the grate is kindled, it is necessary first to drive off the water, and then at a higher temperature to distil off volatile matter. This, if becoming ignited, produces high-temperature flames which transmit heat and promote the propogation of combustion in other parts of the fuel bed in an effective manner.

If the same operation is attempted with a carbonized fuel, there is little or no volatile matter to produce such flames—at any rate, in the early stages. Heat transfer throughout the fuel body is dependent on other processes—viz., radiation, conduction, and convection—none of which is so effective in causing a rapid local rise of temperature as a hot flame. Convection of the hot products of combustion is probably most important, but is relatively ineffective in comparison with flames. The fuel, in consequence, appears sluggish at the start, and lacking afterwards in the flexibility and resilience of a coal fire. If it is desired to accelerate the process of igniting coke, this convection must be intensified, which is easy if the appliance is of the closed type and subject to chimney pull. Indeed, appliances have been designed to combine the appearance of an open fire with the control which can be exercised by the draught of a chimney. In the open domestic fire, however, the fuel bed is only to a limited extent subjected to a direct pull of the chimney. Indeed, in some modern grates this is deliberately avoided, as far as possible. The main function of the chimney in such circumstances is to act as a ventilator and remove products of combustion.

The draught through the fuel bed is mainly self-produced. Now the flow of gases under such conditions is governed by the aero-motive force available and by the resistance interposed. The former is dependent on the density of the gases in the fuel bed, relative to air, and to the height of the column of these gases. The flow of gases through the fuel can therefore be intensified by maintaining a high temperature in the fuel bed with a resulting low density of the gases, or by increasing the height of the column of fuel, or by both together. A reduction of flow will follow an increase of the resistance by using a smaller grade of fuel, or by allowing the ash to accumulate and choke the fuel bed. These factors affect not only the rapidity of heat transfer throughout the fuel bed while kindling a coke fire, but also the rate of air supply during normal burning, and therefore the rate of combustion.

Clearly, the so-called "modern" barless fire-grate does not lend itself to meeting these requirements, unless it is large enough to permit the piling up of a big stack of coke. For those who wish to popularize carbonized fuel, it is unfortunate that this fashion should exist. The range of fuels which can be consumed with ease is thereby appreciably restricted.

The rôle of the chimney in all this is a minor one. Provided that it removes all the products of combustion, its influence on the draught through the fire is unimportant, and it is a fallacy that a strong chimney pull is needed to burn coke. Indeed, a coke fire sufficiently deep will bu. i freely without a chimney at all, as exemplified by the watchman's brazier. On the other hand, it is equally erroneous to suppose that any specially powerful chimney draught is necessary to prevent the production of a sulphury smell when coke is consumed in an open grate. Where such a smell is noticeable, it will usually be traceable to the sluggish combustion of coke on a shallow firegrate lying too far below the opening into the chimney. If the depth of the column of fuel is increased, the top of the fuel bed is brought nearer to the flue opening, the temperature of the flue gases will be higher, and there should be no difficulty in ensuring the complete evacuation of products of combustion. Indeed, in the experiments to be recorded, the chimney draught on the fire was feeble, but it sufficed to evacuate the products of combustion of all the cokes. Once only trouble was experienced, and that was when burning coal. On that occasion the chimney "smoked" badly on lighting.

Moisture in coke is well known to be detrimental. This is due not so much to the depression of the calorific value as to the chilling of the gases in the fuel bed. In lighting the fire moisture retards the rise in temperature of the fuel bed just when a rapid rise is most necessary to promote the flow of hot gases through it. Replenishing the fire with wet fuel later depresses the temperature again, and therefore also the air supply, the rate of burning, and the brightness, and reduces active radiation of heat. This deleterious effect of moisture is the more evident the shallower the fuel bed.

The high ash content is the most serious blemish of carbonized fuels in general, for reasons which are obvious. The choking of the fire by ash interferes with combustion by interposing resistance to the flow of gases through the fuel. It does more. The free radiation of heat is obstructed, and the radiant efficiency of the fire is reduced. The results recorded below suggest that reduction in ash content is probably the most effective means of increasing the efficiency of fuel in an open fire.

These various considerations were in mind when installing the experimental fireplace, which was arranged so that conditions were definitely favourable to the combustion of coke. A small fireplace of conventional design was modified so that the column of fuel could be given a height of 11 in. if necessary. Arrangements were incorporated to facilitate the removal of ash with a minimum of disturbance of the fuel. The fire was kindled with an auxiliary gas burner, and the calorific value of the gas was debited against the fuel in calculating efficiencies. The suitability of such a fire for the purpose was demonstrated by burning the gas coke when the cross-section of the fire was reduced to 7 in. by 5 in., while maintaining the height. While this arrangement is helpful in the combustion of coke, it is not necessarily detrimental to the combustion of coal. Indeed, there is evidence that such a conformation is conducive to high radiant efficiency in the coal fire (*cf.* M. W. Fishenden, "The Domestic Fire," F.R.B. Tech. Paper 13).

Turning to the results obtained, it may be said that the figures are, with certain exceptions, in general agreement with those previously obtained by Fishenden, though the experiments were carried out without knowledge of the details of her experimental procedure. The results obtained for the coal fire were almost identical with those given by her for a fire of the similar form and dimensions. Moreover, the experimental difficulties of measuring accurately the heat radiated by a solid-fuel fire are great, and one would hesitate to claim a high degree of precision for such measurements, or expect a close concordance.

The first experiments were made with a coke fuel of low grade—small, moist, and with a high ash content. The fuel was hardly suitable, but the experiment revealed the importance of adequately insulating the fire-back so as to maintain a high temperature in the fuel bed. This had a very marked effect, both on the radiant efficiency (or proportion of heat radiated), which rose from 15·7 to 23·7 p.ct. (uncorrected for unburnt fuel), and also on the appearance of the fire. It is interesting to recall that when this precaution was observed, the radiant efficiency became good, although, on other grounds, the fuel was hardly satisfactory. It is generally recognized as desirable to pack the back of coal fireplaces; but this appears to be essential if satisfactory performance and efficiencies are to be obtained with coke. If it is attempted to utilize heat at the back, as for water heating, the appearance and radiant efficiency of the fire may be expected to suffer.

A series of experiments followed with a good type of gas coke made in continuous vertical retorts. This fuel gave results for radiant efficiency which were not higher than those obtained with the washed breeze, though the appearance of the fires was much better. No great difference could be traced to the variation in size of the coke, though the highest figure (23·8 uncorrected) was obtained for the grade 1 to 1¼ in. When the fire was burning freely, the best appearance was obtained with coke in large lumps; but the larger lumps were more difficult to ignite. For general utility a mixed grade ranging from

¼ in. to 2 in. is probably the best. The chimney gases from the smaller sizes contained more carbon monoxide than those from the coarser grades.

The sample of bye-product oven coke tried proved unsatisfactory. The coke could be burned in the experimental grate, but showed a more marked lack of flexibility. If the fire were allowed to burn down, its appearance rapidly deteriorated, and unless replenished it soon became extinguished, leaving a large quantity of unburned cinder. It will be noted, however, that the efficiency figure (20·1 p.ct.), reckoned on the fuel actually consumed, was good. These results are interesting because the coal from which this fuel was made was known to produce in gas retorts a coke particularly adapted for consumption in open grates. The coke ovens in question are of the normal wide pattern. No opportunity has arisen for trying a sample of coke made in modern narrow ovens, which are claimed to yield a product resembling vertical retort coke in some respects (*cf.* L. H. Sensicle, J.S.C.I., 1927, 1 T).

The most striking result was obtained with a coke containing less than 2 p.ct. of ash. This was specially prepared from a clean coal in an experimental plant under high-temperature conditions. The radiant efficiency obtained was distinctly higher than any other, up to 29·3 p.ct. (corrected for unburnt fuel); but even this scarcely does justice to the appearance of the fire. The fuel burned very freely, and was able to radiate the heat so developed in an effective manner.

The fire obtained with the low-temperature coke was not dissimilar in appearance and in general behaviour, which was good. The efficiency figures were, however, strikingly different—only 20·1 p.ct. (23·1 p.ct. corrected for unburnt fuel). The figure 20·1 p.ct. (23·1) is lower than that found with the gas cokes, but higher than that found for coal. The low-temperature coke contained more ash, but still less than the inferior washed breeze, which gave a high efficiency figure. Such a result invites consideration, because there is a belief current that coke prepared at low temperatures possesses some marked intrinsic superiority in radiant efficiency over coal and other cokes. Indeed, this has been advanced as a justification for the high prices which it has been necessary to charge for such low-temperature cokes.

In considering what determines the radiant efficiency of solid fuel fires, the conclusion seems reasonable that volatile matter in a fuel will tend to lower the radiant efficiency. When a proportion of the combustible matter volatilizes, some escapes ignition altogether (this is especially true of coal) and passes unburnt into the chimney, producing no useful heating effect. If the volatile matter becomes ignited, producing a flame above the fuel bed, some proportion of its heat of combustion is radiated. This proportion is modest, some 20 p.ct. even from a luminous coal gas flame. It is less for a non-luminous coal gas flame (10 to 15 p.ct.), and still smaller from the flames of hydrogen and carbon monoxide which are so prominent in the volatile matter emitted by a low-temperature coke. In so far as the fuel burns as a free flame above the fire, it follows that the proportion of heat radiated will be reduced. The presence of volatile matter in a fuel will tend to lower the radiant efficiency. This is most marked with bituminous house coal. On the other hand, carbon has perhaps the highest emissive power of any substance, and therefore a coke approximating to pure carbon would tend to have the maximum radiant efficiency, especially since no screening due to ash would be operative. These conclusions are supported by the results given later, and are favourable to cokes such as are manufactured in current high-temperature practice if made from clean coal.

It is interesting to consider here the behaviour of the vertical retort coke when impregnated with sodium carbonate. Soda, it has been shown elsewhere ("GAS JOURNAL," 1926, Vol. 175, p. 882), exhibits a marked catalytic effect on the reduction of carbon dioxide to carbon monoxide by carbon; and this effect was noticeable in the experiment. Instead of the short blue flame commonly seen on the top of a coke fire, flames of carbon monoxide a foot long blazed up into the chimney. The addition of soda had in effect converted a portion of the carbon into volatile matter burning as free flames above the fuel, and, in consequence, the radiant efficiency fell appreciably (20·1 p.ct., uncorrected). The treated coke burned more freely and rapidly, and the appearance of the fire was excellent, but the proportion of heat radiated had been reduced. There was thus a close resemblance to the low-temperature coke.

The conclusion is drawn that, if it is desired to produce cokes giving a high radiant efficiency, the aim should be to have a low content of ash and volatile matter. The presence of volatile matter is conducive to rapid combustion and free-burning properties, and on these grounds a low-temperature coke has advantages; but these qualities seem to be obtained only at the cost of radiant efficiency. A high radiant efficiency is desirable, but its importance must not be exaggerated. It may not be the most important feature from the housewife's point of view. While recognizing the excellences which low-temperature cokes possess, it is, however, undesirable that commercial claims should be made for attributes which they lack.

It had been intended to measure the flue loss of the fire under varying conditions, but structural arrangements hindered the satisfactory measurement of temperature. Determinations were made of the carbon dioxide and carbon monoxide present. The interesting feature of these results was the observation that the carbon monoxide contents of the products from coke were, in general, less than those found from coal.

Coke, burnt under suitably chosen conditions, is just as "safe" a fuel as coal. The intolerable conditions produced by a smoky chimney when coal is burning are doubtless a most effective protection against the consequences of breathing its products. With a coke fire grate as described, no trouble occurred owing to the escape of products of combustion. There was no "smell of sulphur," though the chimney in question was inefficient—so much so that it was difficult to light a coal fire without the escape of much smoke into the room.

Discussion on the Three Papers Dealing with Coke.

The CHAIRMAN felt there was a definite urgency about the information which had been provided in the paper by Miss Bligh and Mr. Hodsman, from the public point of view, at any rate. A great deal was being said about smokeless fuel and about the use of coke, especially for domestic purposes. There was, he believed, among those in authority a certain want of knowledge and a certain amount of difference of opinion; and the sooner the situation was cleared up, the better. At the British Empire Exhibition at Wembley there had been an impressive display of open fires burning coke, in connection with which the public were given copies of a pamphlet prepared by Dr. Vernon Boys; but the prescription given in that pamphlet with regard to the burning of coke was very far from being in conformity with what had been stated in the present paper. One important point in connection with the use of coke which needed a little more emphasis than the authors had given it was in regard to the suspicion with which coke was regarded by the public, as being a source of pollution of the atmosphere by sulphur when burnt in a grate. He had never been able to find any definite evidence that the combustion of coke in an open grate caused contamination of the air of the room with sulphur dioxide. The origin of the suspicion, however, was easy to discover. The ordinary person's experience of coke had been in connection with the feeding of a coke stove, when the products of combustion had been allowed to escape; or they might have passed coke braziers in the street, and received a head-full of sulphur dioxide. They forgot what the atmosphere was like in some long railway tunnels, when they were getting the products of combustion from ordinary raw coal. Finally, the Chairman emphasized the extreme desirability of coming to some definite agreement as to the conditions under which coke should be used in the open grate.

Dr. C. B. MARSON (Leeds) referred to investigations carried out in the Fuel Department of the University of Leeds last year, in which various compounds were added to samples of low-ash coal. When the coke buttons were obtained from the tests made to determine the volatile matter content of the coals, it was noticed that the buttons from the coal to which iron oxide and sodium carbonate had been added were very much shrunk, whereas the buttons obtained from the untreated coal were spongy and swollen. When experiments were carried out on a larger scale, the crushing strengths of the cokes were determined; and it was found that the sodium carbonate coke was equivalent to a metallurgical coke in hardness, whereas the coke from the untreated coal, which was spongy as determined by the volatile matter test, gave a lower figure. Those results did not fit in with Mr. Mott's theory that the more spongy the coke obtained by the volatile matter test, the better the quality of the metallurgical coke obtained. At the Fuel Department at Leeds they had a theory that the addition of some of these compounds affected the coal while it was in the plastic state, and that the evolution of gas took place either before the coal arrived at the plastic stage or after it had passed through that stage. Finally, he said he could not find any reference in Mr. Mott's paper to the amount of the ash or the analysis of the ash in the samples dealt with. In the work which Prof. Cobb and himself had presented to the Institution of Gas Engineers, they had shown that the quantity and nature of the ash in the coal might have a very pronounced effect on the quality of the coke produced.

Prof. COBB, dealing with Mr. Mott's reference to liquefaction as brought about by the internal pressure of gas, on the Beilby theory, said he supposed Mr. Mott would say there were a number of other contributing factors, but that he wished to attach importance not only to the possibility of the existence of this factor, but to the probability of its being a very important one. He gathered that Mr. Mott was merely suggesting a theory. It was difficult to say what factors were decisive, but one might give thought to the question of what factors might be considered in connection with it. For instance, there were some methods of treatment which would rid a coal, even a strongly coking coal, of its coking power. Was such a method of treatment one which at the same time would do away with the generation of internal pressure? If the correspondence between those two phenomena could be established, it seemed to him that Mr. Mott had made out a very strong case; but he did not know that it had been established. One might consider the preliminary treatment of coal at very low temperatures. At the Fuel Research Station the coal was treated at a low temperature—just over 200° C.—after which it was very much the same as before in appearance, but it was largely robbed of its swelling and coking power. Was there any change brought about in the coal at that low temperature which would lead to the removal of internal pressure when the coal was raised to a higher temperature? The answer to that question would have a very pronounced bearing upon the rightness or wrongness of Mr. Mott's contention on this point. One would have to apply the same kind of thought not only to that deliberate treatment at 200° C., but to any other factors which were known to destroy the coking power. Did they destroy the generation of internal pressure? They were certainly a long way

below the point at which the evolution of gas in quantity would naturally be expected.

Dealing with the paper by Mr. Hollings and Mr. Siderfin, he pointed to the statement that in the open grate it was an advantage to use a highly reactive fuel, so that there should be a maximum flame production due to the combustion of carbon monoxide in air above the fuel bed. That was directly questioned, he said, by Mr. Hodsman, who had—he believed for the first time—brought forward the very important point that the combustion of carbon monoxide or any other gas above the fuel bed did not take place with the same radiant efficiency as the combustion of solid fuel, and, therefore, the average radiant efficiency was lower. Of course, that had not to be carried too far, but it did apply particularly to the combustion of carbon monoxide above the fuel bed. If one carried it to the consideration of the solid fuel fire in general, it required careful thought, because so far as the combustion of the gas took place within the fuel bed, and did not screen the coke from air, but raised the temperature of the coke, the conditions of the gas fire, with a high radiant efficiency, were reproduced. But if there were a big screening effect, as would be the case in the presence of too much volatile matter, where one was actually shutting off oxygen from the solid carbon, the combustion of volatile constituents must inevitably lower the radiant efficiency of the fire. The statement that the most suitable fuel for producers was clearly one which reacted most readily with carbon dioxide, seemed to be true. The curves published by Mr. Hollings and Mr. Siderfin for reactivity with carbon dioxide were, generally speaking, similar to those obtained at the Fuel Department at Leeds. The falling off of reactivity in treated cokes was remarkable, and they had not yet got an explanation of it; but, from the experience obtained at Leeds, he utter a warning against premature conclusions on the behaviour of sodium carbonate coke, because all sorts of funny things had been ascertained by experiments which still defied complete explanation. The falling off of reactivity, however, was not a characteristic of what might be called "artificial" cokes in general. It did not apply to cokes made by the addition of oxide of iron, lime, and so on, but seemed to be a particular property of the sodium carbonate coke. It was also advisable to be very careful in relating reactivities with ignition temperatures. There was rather a temptation to say, in order to arrive at results quickly, that the reactivity with steam and with CO_2, and the ignition temperature, were all related in a simple way. This might be; but there were some peculiar contradictions which were forthcoming on further examination, and it certainly was not a fact that in every case a highly reactive coke had a very low temperature of ignition. The nature and distribution of ash were important factors in determining the behaviour of coke, particularly when it was going to be used in an open grate. Some cokes, and particularly some coals, cleared themselves very well of ash, and retained a very high efficiency. Others did not; and the ash, when formed, would cling, and form a most effective radiation screen.

Dr. E. W. Smith said he was not at all satisfied that the aim should be high-temperature radiation in domestic heating. He thought it was no more logical or useful to have an increased temperature of radiation for domestic heating than it would be to introduce searchlights into houses in order to get good lighting. From the physiological point of view, he understood that the lower temperature radiations were more effective than those of higher temperature. Dealing with Mr. Mott's paper, he asked whether it was suggested that the cracks shown in the photographs of samples of coke were due to the pressures developed, or that the cracks allowed the gases to escape. Without a great deal of further evidence, he would not accept a statement that they were due to the pressure developed. It was proved by microscopic examination that in blending coals the gases escaped owing to the continuity of the pores. As gas evolution was a relatively slow process, and heating was comparatively slow, it was possible for the gas to get away by the pores developed as the heat went into the coal; and this might be an explanation why these cracks developed. The principal conclusion to be drawn from the paper by Messrs. Hollings and Siderfin was that all the manufacturers of small domestic stoves were making them on the wrong lines, and that they should produce stoves which would suit, not anthracite—for which they were originally designed—but the cokes which were available, subject to the cokes being properly graded. It was not that coke was difficult to handle, but that the stove was wrong. Coke could be graded and produced with low ash and moisture contents; and it was a product which should be, and could be, used very effectively if the right stove were available. He deprecated the enormous waste of coke in domestic stoves during the night, when the whole of the heat was generated merely for the purpose of keeping the coke alight. There should be some combination between coke and gas, so that such waste would not be necessary, and the fire could be relighted in the morning. They had to recognize that the open solid-fuel fire was not a permanency, and that in time it would be a thing of the past. There was no special reason why Great Britain should be the one country in the world in which the open fire was general. In every other country in the world there was closed, controlled heating, which was more efficient, but less attractive. The supply of "Hodsman" fires represented the intermediate stage. Dealing with the question of the emission of sulphur fumes from coke fires, he said that coke suffered from a disadvantage as compared with coal because the fumes could not be seen.

Dr. J. G. King (H.M. Fuel Research Station) discussed the method developed at the Fuel Research Station for the determination of the reactivity of coke, which was referred to in the paper by Mr. Hollings and Mr. Siderfin. The work, he said, was being carried out in liaison with the Federation of Iron and Steel Manufacturers. A paper on the development of the standard method was in the Press, and would shortly be published as a Technical Paper by the Fuel Research Board. In this method the CO_2 : C reaction was used. The reactivity of coke was measured by the volume of carbonic oxide obtained when 100 c.c. of carbon dioxide were passed at a rate of 5 c.c. per minute over a standard volume of sized coke which had been subjected to a standard pre-treatment with nitrogen, and was maintained at a temperature of 950° C. Investigation had been made of the range and sensitivity of the apparatus, and a study had been made of the effect of possible variables—temperature, time of contact, and size of coke used. Three definite reactivity values were obtained. These had been termed arbitrarily Reactivities I., II., and III.; and it was considered that a knowledge of all three was necessary before the reactivity of the coke could be satisfactorily defined.

Reactivity I.

The coke sample was heated from room temperature to 950° C. in a stream of purified nitrogen in one hour, and maintained thus for a second hour, the nitrogen still passing. After the passage of a preliminary 100 c.c. of carbon dioxide to sweep out the reaction tube, the reactivity figure was obtained by the volume of gas, measured over caustic potash solution, obtained from 100 c.c. of carbon dioxide, passed at the standard rate. This gas still contained some volatile matter derived from the coke, but normally it had a carbonic oxide content of the order of 95 p.ct. If a strict adherence were maintained to standard procedure, good constancy could be obtained from any one sample.

Reactivity III.

The continued action of carbon dioxide at 950° C. produced a decrease in reactivity, which decrease gradually became smaller until a value was obtained which was constant over four or five determinations. At this stage the decrease had become so slow as to be incapable of detection by the action of small volumes of carbon dioxide. The value at this stage was termed Reactivity III., and was substantially the same as that obtained by Mr. Hollings and Mr. Siderfin. A possible exception to this was to be found in the case of certain hard metallurgical cokes which showed little reactivity decrease and gave a constant value from the beginning, in which case the values for Reactivities I. and III. were almost alike. The relative values of Reactivities I. and III. and the type of curve (obtained by plotting reactivity value against volume of carbon dioxide passed) connecting them were of interest when estimating the probable value of a coke for industrial purposes.

Reactivity II.

The continued passage of nitrogen over a sample of coke maintained at 950° C. produced a decrease in reactivity, until after about five hours' passage the value became approximately constant, and was termed Reactivity II. This effect could most probably be attributed to the removal of volatile matter from the coke. After Reactivity II. had been obtained, continued passage of carbon dioxide again produced a decrease which finally resulted in the constant value Reactivity III., which could thus be obtained either directly from Reactivity I. by passage of carbon dioxide, or indirectly by passage of nitrogen until Reactivity II. was reached, followed by subsequent treatment by carbon dioxide.

Dr. King exhibited a table (Table I.) giving the results of three separate determinations on one coke, showing the transition from Reactivity I. to Reactivity III., and also the change from Reactivity II. to Reactivity III. on the same coke. The same constant value of about 100 was reached in each experiment. Another table (Table II.) showed results obtained with industrial cokes. This demonstrated that whether Reactivity I., II., or III. be used as the criterion, there was a distinct division between types of coke. Of interest also was the fact that Durham and South Wales cokes fell into distinct classes, the former giving the slightly higher values. Nos. 1 and 2 in Table II. were first-class blast furnace cokes, while Nos. 3 and 4 were not used for metallurgical purposes.

Table I.—*The Effect of Passage of Carbon Dioxide.*

Litres of CO_2 Passed.	Reactivity I. to Reactivity III.			Reactivity II. to Reactivity III.
	A.	B.	C.	
0·2	140	135	134	116
0·4	130	112	121·5	105
0·6	115	110	117	105
0·8	113·5	109	112	102
1·0	113	109	110	100
1·2	106·5	108	107	99·5
1·4	106	98	104·5	99
1·6	103·5	97	104·5	98·5
1·8	99·5	98·5	104	..
2·0	100	99	100·5	..
2·2	100	97	..	..
2·4	98	..	100·5	..
2·6	98	..	100	..
..	..	..	98	..
Mean value .	99	98	100	100

Table II.

Coke.	Reactivity.		
	I.	II.	III.
1. S. Wales	69	69	40
2. Durham	80	63·5	60
3. Horizontal retort gas, Durham .	145	131	78
4. Coke by Strafford's process . .	134	116	98
5. Vertical retort coke	120	72	59
6. Sutcliffe-Evans, low temperature	178	124	75

Dealing with gas producer practice, he indicated results which he had obtained in 1922, using a small producer. The constants were depth of fuel bed, size of coke, and rate of passage of air. The variables were the nature and reactivity of coke, and, therefore, the

reaction temperature. The observations were rate of carbon burned per hour and CO_2-CO ratio in the gas:

—	Deg. C.	Lbs.	Ratio.
Wood charcoal	600	9·0	0·23
Briquettes (Sutcliffe Speakman)	800	7·0	3·91
,, ,, ,,	600	6·6	0·98
Low-temperature coke, F.R.S.	,,	5·6	2·5
Gas coke, horizontal retorts	,,	5·3	6·7

This investigation was not followed up at the time, but it was apparent that the cokes fell into a series similar to those of Messrs. Hollings and Siderfin's stove trials; and the wide difference in CO_2-CO ratio offered a promising means of comparison. One warning was necessary, however—that size had so great an effect as to mask differences in reactivity. The horizontal retort coke mentioned above, for example, was examined in three sizes, and the variations shown were very great:

Size.	Lbs.	Ratio.
0 to ¼ in.	7·6	0·8
¼ ,, 1½ ,,	6·7	1·8
1½ ,, 2 ,,	5·5	16·0

During the coal strike the low-temperature coke made at the Fuel Research Station was sold to householders, and a questionnaire was sent out with regard to it. The majority were very pleased with it so far as its use in open fires was concerned, but the kitchen ranges were not suited to its use, and adverse opinions were expressed in that connection.

Mr. FINN (Manvers Main Colliery) said that he would require a little more experimental evidence before he could adopt the theory put forward by Mr. Mott. He disagreed with a statement in the paper that, because of their greater hardness compared with bright coals, hards usually did not appear in great proportion in the fine coal resulting from mining operations, and that preparation of the coals for the market, and their study in this connection, were of more academic than practical importance. He was concerned with the practical coking of coal, and received coals sometimes containing very large percentages of hards, particularly from certain parts of the Yorkshire coalfield. The coking coal in the plant with which he was concerned was mainly Park Gate, and contained a small proportion of hards; but a quantity of Barnsley coal was mined in the same pit, and this had an appreciable proportion of hards in the smalls. When the ovens were charged with Park Gate coal, uncrushed, a good coke was produced; but when the two coals were mixed together, the hards came out in compact little blocks embedded in the swollen coke around them, and set up points of fracture, so that a good deal of small was produced. When, however, the coals were crushed and the hard portions intermixed with the softer portions, a uniform and homogeneous coke was produced. Therefore, he considered that the preparation of the hards for the market and their study in this connection were of practical importance. There were good reasons for producing some of the hard coals. In the old days people wanted coke made from hards because it was very low in sulphur and ash contents. If one could mix the softer and the harder portions together by grinding, one could produce a better coke than that made from the softer portions only. Finally, he urged that, when dealing with samples of bye-product coke, the authors should have been more precise, and should have given particulars as to the sizes of the ovens in which they were produced, the methods of charging, and so on, because there was too much looseness of expression about bye-product coke.

Dr. A. PARKER (Leeds), dealing with the paper by Messrs. Hollings and Siderfin, said the impression seemed to be that a poorly reactive coke was best for the blow period in the water gas process. He would imagine that this was correct, and also that a highly reactive coke would probably be better for the run period or steaming operation. It was also stated that in the American work high air velocity during the blow period was accompanied by less loss of potential and sensible heat in the blow gases. In water gas manufacture, however, there were many more complications than this. His own opinion was that, if the cycles of operation were adjusted, one would probably get about the same efficiency, no matter what type of coke was used in the generator. It was a matter of adjusting the depth of fuel bed and the cycle—*i.e.*, the length of time of blow, the length of time of run, and rate of steaming. With regard to ignition temperature, reactivity with CO_2, and reactivity with steam, he said it had generally been assumed that a low ignition temperature probably corresponded with a high reactivity towards CO_2 and steam. But there were exceptions. In the work that was being carried out at the Leeds University, the coke with the highest ignition temperature happened to be the coke with the greatest reactivity towards steam, whereas the general conclusion was that the reverse was the case; and the more they had gone into the matter, the more they had found that they could not generalize. They had abstracted a large number of papers on the subject—and there were hundreds published in this country, in Germany, and in America—and had found that one half-dozen disproved everything that was proved in another half-dozen. Dealing with the sampling of coke, he said that in testing the cokes they made in their carbonizing plant for reactivity with steam and CO_2, and for ignition temperature, they had found that the utmost precautions must be taken in making the graded sample possess the same average ash content as the bulk of the coke. This was not an easy matter, and it took them longer to make a sample having the same average ash content than to carry out the test. They had graded the bulk of coke, and had then taken an average sample of each grade, to see what effect grading had, and had found that it had a remarkable effect. By sampling each grade, by analyzing the samples for ash, and by judicious mixing, a coke was made having the same average ash content as the original coke. Finally, with regard to porosity, he said that cokes had been made from the same coal, some possessing small pores and thin cell walls, and some with larger pores and thick cell walls. According to all pre-conceived ideas, the coke with the small pores and thin cell walls should be more reactive and should possess a lower ignition temperature than the coke with the larger pores and thick cell walls made from the same coal, but so far they had not been able to observe any differences. There again, however, they were dealing with only one coal, and he would not like to put that forward as a general conclusion; it was probably not.

The authors intimated that they would reply to the discussion in writing.

FUSIBILITY OF COAL ASH AND CLINKER FORMATION.

Results of an American Investigation.

There has just been published by the Carnegie Institute of Technology, Pittsburgh, Bulletin No. 29, Mining and Metallurgical Investigations. These investigations are carried out under the auspices of the Carnegie Institute, the United States Bureau of Mines, and the Mining and Metallurgical Advisory Boards; and Bulletin No. 29 is a first report by W. A. Selvig and P. Nicholls (U.S. Bureau of Mines) and W. L. Gardner and W. E. Muntz (Carnegie Institute). There is an introduction by E. B. Ricketts, of the New York Edison Company.

The investigation was undertaken at the request of the Committee on Coal and Coke of the American Society for Testing Materials, with the object of determining the relation between the fusibility of coal ash and clinker formation in the fuel-bed of furnaces. Seven coals, having ash-fusion temperatures ranging from 2070° to 2930° Fahr, were selected for comparative burning tests in a specially-designed hand-fired furnace so arranged that the air supply could be accurately controlled and measured, and that temperatures could be observed at various points in the fuel bed. Tests were made at 20, 30, and 60 lbs. of coal burned per sq.ft. of grate area per hour. Observations on clinker formation were made during the tests, and after completion the percentage of ash fused into clinker was determined. These observations and determinations were then compared with the average ash of the coal fired, and also with the fusibility of the intrinsic ash of the coal. Intrinsic ash is that which is intimately mixed with the coal substance, and which cannot be removed by washing. The following are the tentative conclusions drawn from the work.

TENTATIVE CONCLUSIONS.

The average quantity of clinker formation relative to the total ash in the coal, and also the size of the clinker pieces, seem to have a fairly definite relation to the softening temperature of the coal ash, as determined by the standard gas furnace method.

This relation is better expressed by using the softening temperature than it is by that of the initial or fluid temperatures.

No better relation can be obtained from the softening temperatures of the ash of the float-and-sink portions of the coal separated by fine grinding and using a liquid of 1·35 specific gravity.

Clinker formation does not increase materially until the softening temperature of the coal ash is below 2600° Fahr.

Coke Oven Practice.

The fourth of a course of lectures dealing with modern developments in regard to fuel was delivered at the Sir John Cass Technical Institute, Jewry Street, Aldgate, E.C., on Monday evening, March 7, when the lecturer was Mr. Ernest M. Myers, F.C.S., who took for his subject "Coke Oven Practice." Dealing first with the preparation of coal for coking, he explained the process of washing, by means of which a very large proportion of the free dirt is removed. The coal is, however, so wet after the washing that de-watering has to be resorted to; and for this purpose the Carpenter centrifuge is resorted to in one or two cases in this country, and largely in America. There are, of course, also processes for the dry cleaning of coal. A number of coking plants were illustrated during the lecture—including the Simon-Carves and Semet-Solvay horizontal ovens, the Koppers taper regenerative oven, the two types of Simon-Carves "Underjet" regenerative oven, and the Becker type. Methods of charging and discharging were explained, as also quenching with water and dry quenching on the Sulzer process.

CORRESPONDENCE.

[We are not responsible for opinions expressed by Correspondents.]

First Principles in the Study of Technical Problems.

Sir,—In your leader in this week's issue of the "Journal" it is suggested that there is a renewal of the controversy between Dr. Parker and myself. It takes two to enter into a discussion, and as I only read Dr. Parker's paper on Saturday, March 5, I had no opportunity of joining in the discussion, even had I wished to do so. The note on the calorific value of coke, which I put together hastily on Sunday morning, was sent to Leeds for the reason that I thought it of some interest in connection with Dr. Parker's paper and with the paper by Messrs. Hollings and Siderfin.

If I felt that Dr Parker, even at this date, understood my object in writing the paper about which he has had so much to say, I should drop the matter. However, it seems that he does not; and as a point of principle rather than one of fact is involved, I should be glad of the opportunity of stating what I have been aiming at. I am the more anxious to do so since a remark by Dr. King, of the Fuel Research Board, suggests that that body also entirely misunderstands me. What I have to say now really concerns the planning of investigations such as those carried out by the Fuel Research Board and by the Gas Investigation Committee, and not the mere question of whether the loss in a particular experiment or test was 2 p.ct. or 5 p.ct. The position in which the discussion at Leeds leaves the matter is that the wood is obscured by the trees.

The object of any technical investigation of the kind which we are discussing is not merely to decide as to the most favourable conditions for the running of a particular plant, but to study a very important technical process on the broadest lines, so as to determine, if possible, the influence of various factors in its efficiency. One may look at the question of efficiency from two points of view. On the one hand, one may have regard only to the output from plant of certain dimensions; and in this case efficiency is a matter of capital cost and running charges. On the other hand, one may look at the question from the standpoint of output of product per unit of material. In the case of water gas, the product is purified water gas, and the raw materials are coke and steam. In this case it is possible to investigate the two aspects of efficiency simultaneously; but, as a matter of fact, very little has been said of the first aspect, and it has not been mentioned in the discussion between Dr. Parker and myself.

Now there are really three methods of attacking the problem in the case of water gas. The first method, adopted by Dr. Parker by force of circumstances, is that of carrying out tests on plant installed in works. The method involves great difficulties, for the plant must be used with little material alteration, and there is always in the background the shadow of the engineer in charge insisting upon maintaining both quality and output. Such tests on a single plant can hardly yield results which are general and conclusive, though the results can be of very great value. It is no use attempting to claim for them more than they actually demonstrate. The second method is to use an experimental plant, and to work, if possible, in an experimental station. Free from the vigilance of the officer concerned with quality and output, many things are possible. The work of the Fuel Research Board was carried out under conditions which approached the ideal; and, as a consequence, they were able to cover a range which was impossible in the case of Dr. Parker's experiments. However, it is up to His Majesty's Fuel Research Station to do their work really well; and that they did not make arrangements to measure the air, and to account for losses of carbon, are faults which are not easily excused. Their work should have been of such quality as not to require repetition.

Now there is a third method of investigation, which does not replace either of the other methods, but which, in accordance with modern scientific practice, should have been put into operation before either serious tests of plant, or investigations with experimental plant, were undertaken. This is the investigation on the basis of general scientific knowledge, by the application of first principles. This is what I attempted to do. It is a method which is very difficult of application in many cases; but in the case of water gas manufacture preliminary investigation showed that the efficiency of production, expressed in terms of output of water gas per unit quantity of coke, was controlled by three main factors, in relation to which all other factors were relatively unimportant. These factors are:

1. The relative proportions of CO_2 and CO in the blow gas.
2. The temperatures of the gases leaving the plant.
3. The loss of carbon not converted into blow gas and water gas.

In attempting to deal with the problem generally, and to assess the influence of these factors, it was necessary to adopt certain conventions. The first of these was that the problem was based upon standard British practice, and that the CO_2 and N_2 were limited to 5 p.ct. and 6 p.ct. respectively. American practice allows of larger quantities of these constituents: but to work to any other standard merely involves making a separate set of calculations. Next, it was necessary to adopt a standard as to the coke used; and instead of taking a figure for the calorific value of coke, it was easier to adopt an arbitrary value for the heat of combustion of carbon, and for the heat changes in the secondary reactions agreeing with this value. Finally, the secondary factors had to be assigned values indicated by the results of experiments.

Now I want to point out here that anyone wishing to deal with the results of particular experiments must necessarily alter the basic figures to suit the actual facts. Dr. Parker may be perfectly right in taking the calorific value for the coke used in the Birmingham tests to work out the results of these tests, but only so long as he uses values for the heats of the secondary reactions which are in accordance with it. However, this has nothing to do with my own work, unless it is supposed that I chose to take Dr. Parker's experiments as being of a completely standard character, which I did not. I was aiming at the general treatment of the subject. Dr. Parker is aiming at the checking of particular experiments.

On completing my analysis of the process, and reviewing what had been done, it was at once obvious that there were two sources of error in the results of published experiments, the magnitude of which there was no possible means of estimating. These were:

1. The neglect to allow for the carbon not gasified but lost in the blow and during clinkering.
2. The temperature measurements were made by methods which must give low results, involving an uncertain error.

Ignoring these errors does not make them negligible; and one's general experience of processes such as the water gas process inclines one to the conclusion that such losses are often surprisingly large. I do not want to enlarge on this point now. On studying the details of the published results of the various investigations, I was rather surprised to find that my conclusions agreed very closely with those arrived at by the Fuel Research Board. I do not mean that I attached much importance to the details of individual tests, but that the conclusions arrived at from first principles, and from experiment, on the influence of the CO_2 : CO ratio in the blow gas and of the temperature of the gases leaving the plant on the water gas production, were generally in close agreement.

Now it does not matter much whether the calculations based upon arbitrary assumptions agree with the details of Dr. Parker's experiments or not. It is not a question of "correcting" my figures to bring them into line, but a matter of calculating to a fresh basis. However, it is of importance that, while my attack on the problem from first principles and the attack by the Fuel Research Board by experiment lead to the same conclusion as to the influence of CO_2 : CO content of the blow gas on water gas production, they are absolutely antagonistic to the general conclusions to be gained from the Tenth Report. Further, the system of heat balance-sheets used by the Investigation Committee in no way indicates the influence of the dominant factors on water gas production, nor does it explain the results of the Tenth Report, or of the report of the Fuel Research Board on water gas manufacture. It is up to Dr. Parker to refute this statement by showing how his method can be used for this purpose.

It is always easy to be wise after the event; but if I really wished to criticize those who carried out the two series of tests to which I have referred, it would be mainly on the score that they did not carry out my part of the investigation—the inquiry into the influence of the important factors—before undertaking the experimental work. This is the proper course for any investigation to follow, and there is a great deal too much being done in the way of piling up data, without attempting to apply first principles to the scientific analysis of technical problems. There is a quotation from the writings of the late Prof. W. K. Clifford which stands at the head of the paper describing the discovery of argon by Lord Rayleigh and Sir W. Ramsay, which all investigators, scientific and technical, should always bear in mind. It reads: "Modern discoveries have not been made by large collection of facts. . . . A few facts have suggested an *hypothesis*, which means a supposition proper to explain them. The necessary results of this supposition are worked out; and then, and not till then, other facts are worked out to see if their ulterior results are found in nature." This was the principle upon which Ramsay and Rayleigh were content to work, and it is good enough for me; indeed, I know too well that it is the only principle on which to work. In common language it means that as soon as one has sufficient facts to handle, one should use them as far as is possible to analyze and solve the problem to which they relate, and *to plan further investigation.* To proceed further without making use of the material at hand, or attempting to solve, or at least elucidate, the problem, on the basis of first principles, necessarily involves waste of time, not to speak of waste of money. My contribution to the study of the water gas problem has been such an attempt to apply first principles; and I fail to understand where I have sinned in so doing.

Morris W. Travers.

147, *Queen Victoria Street, E.C.* 4,
March 12, 1927.

LEGAL INTELLIGENCE.

DISPUTED GAS ACCOUNTS.

At Doncaster County Court, on March 10, His Honour Judge Turner indulged in some candid criticisms of what appears to have been slackness in business methods on the part of the Swinton and Mexborough Gas Board. The Board were suing Albert Smalley, a Mexborough coal merchant, for £52 18s. 10d. for gas supplied, and alleged that the defendant had been irregular in his payments, and that from March, 1915, to October, 1920, he appeared to have paid nothing. The defence was that Smalley had paid every account up to 1925; and he showed a number of receipts on which arrears were marked as "None." A witness for the Gas Board admitted there had been an error in one account, and also that, owing to the war and domestic trouble, he had got behind with his books. His Honour said he would need a lot of satisfying that there were any arrears. The accounts were not worth the paper they were written on; and if this was an example of municipal trading methods, it was rather pathetic. Eventually the judge gave a verdict for the plaintiffs on an admitted claim for £2 3s. 8d.; but for the remainder of the claim he gave the verdict for the defendant, with costs on the part of the claim relating to the time prior to March, 1924. His Honour commented that the Board seemed, from this case, to be a most unbusinesslike organization.

REGISTER OF PATENTS.

Purifying Gases from Sulphur.—No. 254,288.

FISCHER, F., and TROPSCH, H., both of Mülheim.

No. 14,091; June 3, 1926. Convention date, June 29, 1925.

This invention consists in a catalytic process for purifying gases and gas mixtures from sulphur compounds; the essential feature being that for the contact means such metals as lead and tin or corresponding alloys are used which do not otherwise alter the gas mixtures as would be the case if iron, cobalt, or nickel were used. The metals are arranged in a finely divided state and in intimate admixture with inorganic substances which remain solid at the reaction temperature—such as bases or acid anhydrides—and the catalytic process is performed at a temperature exceeding that of the melting point of lead—namely, 334° C. Such a contact preserves its activity for months. The working can be carried out at a temperature of 400° to 600° C. under atmospheric pressure, all sulphur combinations of the gas then being converted into easily absorbable sulphuretted hydrogen.

The permanency of the contact is so high that it is not necessary in its application first to remove the free sulphuretted hydrogen in the usual manner. On the contrary, the raw gas can be directly conducted over the contact. After the separation of the original and fresh formed sulphuretted hydrogen, the gas mixture is practically free from all sulphur combinations—it has, for instance, been reduced to less than 0·1 gr. in 100 cub.m.

Automatic Gas Regulators.—No. 264,423.

WILLIAMS, G. A., of Stoke Newington, N. 16.

No. 24,056; Sept. 29, 1926.

This invention refers particularly to regulators of the kind in which a loaded flexible diaphragm is employed for controlling a gas valve whereby the outlet pressure is regulated.

According to the invention, the passage leading from the underside of the diaphragm is inclined; and disposed at a right angle to the line of this passage, in a manner such that while it is readily accessible it does not project beyond the limits of the case, is a screwed stud whereby the passage of the gas may be regulated. The casing round the head of the stud is recessed to contain a seal to prevent unauthorized manipulation.

Furnaces.—No. 264,938.

KING, TAUDEVIN, & GREGSON, LTD., and NELSON, C., both of Sheffield.

No. 27,230; Oct. 30, 1925.

This invention relates to the heating of annealing and heat-treatment furnaces. Primary air, gas, and a restricted amount of preheated secondary air are supplied to the furnace at two or more heights. Partial combustion takes place in the furnace, and tertiary air is admitted at the top of the furnaces, for causing complete combustion. In some cases this tertiary air is preheated.

Cooling Coke.—No. 265,337.

GILL, G. M., of Victoria Street, S.W.

No. 31,207; Dec. 10, 1925.

This invention relates to improvements in the so-called dry method of cooling hot coke, according to which method waste-heat gases from a retort or oven are led to a waste-heat boiler where they give up part of their heat. The gases are then brought into contact with the hot coke, from which they extract heat, and are led again to the waste-heat boiler. According to this invention the waste-heat gases, after they have cooled the coke, are led not to the original waste-heat boiler, but to a second one. This arrangement has the considerable advantage that, whereas the supply of gases from the ovens to the first boiler is substantially regular, the supply of gases to the second boiler is intermittent.

A further feature of the invention consists in introducing the coke to be cooled directly from the retorts or ovens into a truck in known manner, and there cooling the coke by means of waste-heat gases that have previously been passed through a waste-heat boiler. Another feature of the invention consists in the elimination of the oxygen contained in the waste gases, by means of producer or other gas. For this purpose producer or other gas is admitted to the waste-heat gases at a suitable point, preferably near the inlet to the waste-heat boiler. This producer gas, which is suitably regulated, serves to consume the oxygen in the waste-heat gases, and convert it into carbon dioxide.

Manufacture of Coal Gas.—No. 265,349.

SOUTH METROPOLITAN GAS COMPANY and EVANS, E. V., both of Old Kent Road, S.E.

No. 32,065; Dec. 18, 1925.

In carbonizing coal at a high temperature the make of gas may be increased by admission of steam into the retort, but the calorific value of the gas made is diminished by the addition of water gas. By this invention the calorific value of the mixture of coal gas and water gas is suitably increased by adding to the mixture a gas made by carbonizing coal at a low temperature by means of the waste heat from the setting of the high-temperature retort. In some cases such waste heat suffices for carbonizing at the low temperature enough coal to yield the required enriching gas; but in other cases some further heat may have to be supplied.

A plant for making coal gas according to the invention comprises a high-temperature carbonization retort or set of retorts, means for steaming continuously or at the most advantageous period of the carbonization, a low-temperature carbonization retort or set of retorts adapted to be heated by the waste heat from the setting of the high-temperature carbonization retort, with or without the aid of other heat, and arrangements for mixing the gases produced by the carbonization in the two kinds of retort.

In the case of intermittently operated horizontal retorts, for instance, in which the normal charge is 10 to 13 cwt. introduced in such a manner as practically to fill the retort and in which the final retort temperature is 1050° to 1100° C., steaming during the last 90 minutes of the carbonizing period may be expected to yield 10 or 12 extra therms of gas per ton of coal; the whole make of gas having a calorific value of about 500 B.Th.U. per c.ft. When the final calorific value of the gas is required to be 560 B.Th.U., the amount of low-temperature carbonization gas necessary for addition to the said make of gas per ton of coal treated at high temperature is yielded by the treatment of about ⅓ ton of coal at low temperature. The waste heat from the setting of the high-temperature retort will suffice to heat the lower temperature retort unless there is much loss in transference of the waste heat, in which case a small quantity of producer gas may be introduced into the low-temperature retort setting.

APPLICATIONS FOR PATENTS.

[Extracted from the "Official Journal" for March 2.]

Nos. 4773—5482.

ALDER & MACKAY, LTD.—"Control of gas supply to burners." No. 5399.
ALDER & MACKAY, LTD.—"Gas pressure registers." No. 5400.
ANDERSON, J.—See Alder & Mackay. No. 5399.
BENNET, J. L.—See Alder & Mackay. No. 5400.
COLEY, H. E.—"Apparatus for manufacture of gas." No. 5229.
COLLIN AKT.-GES. ZUR VERWERTUNG VON BRENNSTOFFEN UND METALLEN, F. J.—"Method of discharging ammonia sulphate from saturating tanks." No. 4881.
DAWSON, H.—"Burners for gas stoves." No. 4948.
GOULD, F. J.—"Incandescent gas burners." No. 4857.
HENSHAW, D. M.—"Drying gases." No. 5264.
HILL, H. T.—"Gas burners." No. 5160.
HOLMES & Co., LTD., W. C.—See Henshaw, D. M. No. 5264.
HUDSON, G. C. & J. J. C.—"Gas burners." No. 4836.
HUMPHREY, H. A.—"Production of methane." No. 4942.
HUMPHREY, H. A.—"Production of semi-coke." No. 4943.
LAING, B.—"Distillation of carbonaceous materials." No. 4842.
LAMBERT, A. J.—"Controlling-taps for water-heaters." No. 4923.
LESSING, R.—"Fuel briquettes." No. 4915.
METERS, LTD.—"Gas meters." No. 5262.
NIELSEN, H.—See Laing, B. No. 4842.
NIELSEN, H.—"Rotary cooling devices." No. 5348.
PARKER, J.—See Henshaw, D. M. No. 5264.
PEASE, E. L.—"Washing apparatus for gases and liquids." No. 5465.
SALERNI, P. M.—"Apparatus for distillation of carbonaceous materials." No. 5380.
SIDES, H.—See Meters, Ltd. No. 5262.
SLADE, R. E.—"Steam distillation of coal." No. 4788.
SMITH, W. MEISCHKE-.—"Scrubbing apparatus for gases." No. 5395.
STANCLIFFE, C. W.—"Heating fluids by gas." No. 5377.
SYNTHETIC AMMONIA AND NITRATES, LTD.—"Steam distillation of coal." No. 4788.
SYNTHETIC AMMONIA AND NITRATES, LTD.—"Production of methane." No. 4942.
SYNTHETIC AMMONIA AND NITRATES, LTD.—"Production of semi-coke." No. 4943.
UPWARD, A. R.—"Application of heat of gas flames to culinary vessels." No. 5223.
URBAIN, E.—"Simultaneously producing water gas, phosphoric acid, and high-alumina cement." No. 5296.
WIBERG, F. M.—"Method of reducing, to carbon monoxide, carbonic acid content in gases." No. 5165.
WILSON, J. H.—"Gas-meters." No. 5206.

[Extracted from the "Official Journal" for March 9.]

Nos. 5483—6246.

ALLSOP, C. B.—"Gas ring radiator." No. 6042.
CHEMISCHE FABRIK IN BILLWARDER VORM. HELL & STHAMER AKT.-GES.—"Obtaining high-grade products from raw coal." No. 6209.
COLQUHOUN, A. C.—"Range fittings for gas burners." No. 5940.
DEUTSCHE GASGLUHLICHT AUER GES.—"Indicating exhaustion of gas cleaning substances." Nos. 5694, 5773.
EWARTS, LTD.—"Liquid pressure gauges." No. 5658.
GLASGOW, CORPORATION OF CITY OF.—Range fittings for gas burners. Nos. 5936, 5940.
GOSKAR, T. A.—"Distillation of carbonaceous materials." No. 5751.
HUDSON, G. C. & J. J. C.—"Gas burners." No. 5946.
KUHLWEIN, F. L.—See Chemische Fabrik in Billwarder vorm. Hell & Sthamer Akt.-Ges. No. 6209.
MARWOOD, F. T.—"Gas cooking stoves." No. 5682.
NEISH, D. D.—"Range fittings for gas burners." No. 5936.
NISHIGAWA, T.—"Manufacture of ammonium sulphate." No. 5747.
POPE, P. C.—"Apparatus for low-temperature carbonization." No. 6005.
SEEHAUS, P.—"Gas heated cooking plate devices." No. 5742.
SIMPSON, S.—"Dry gas meters." No. 5660.
SMITH, H. E.—"Burners for gas ovens." No. 5830.

PARLIAMENTARY INTELLIGENCE.

HOUSE OF LORDS.

Progress of Bills.

Bognor Gas and Electricity and South Staffordshire Mond Gas Bills: Read a second time, and committed.

Norwich Gas Order: Referred to the Special Orders Committee.

HOUSE OF COMMONS

Progress of Bills.

Farnham Gas and Electricity and Reading Gas Bills: Reported, with amendments.

Norwich Gas Order: Copy presented.

The petition deposited on behalf of the London, Midland, and Scottish Railway Company against the Stoke-on-Trent Corporation (Gas) Bill has been withdrawn.

Cost of Coal.

Replying to a question by Mr. William Thorne in the House on Feb. 28, Mr. A. M. Samuel stated that the Mines Department had from gas companies, municipalities, and other local authorities no information showing the extra cost of coal incurred during the period of the miners' lock-out.

Coke Ovens.

Mr. Hardie, on the 1st inst., asked the Secretary for Mines if there was a shortage of metallurgical coke; how many coke ovens were at work and how many idle; and what amount of coke was imported during the month of January last.

Sir P. Cunliffe-Lister replied that he was aware of a shortage in some districts; but he could not say how many coke ovens were at work and how many idle. The quantity of coke, other than gas coke, imported during January was 17,000 tons.

Fuel Research.

Mr. Connolly asked the President of the Board of Education, on March 3, whether the Special Report on the work done by the Fuel Research Station during 1926 had been published; if not, when it would be ready. Alternatively, some clear statement on the authority of fuel technologists, showing the present position regarding smoke prevention, was asked for.

Lord E. Percy said the Special Report on the work on low-temperature carbonization carried out during 1926 had just been issued.

Railway Wagons.

Mr. Clarry, on the 8th inst., asked the Minister of Transport if he was aware of the continuous delays, congestion, and inadequate railway service now obtaining in the Eastern Counties served by the Great Eastern Section of the London and North-Eastern Railway Company, and that, in consequence, many gas undertakings were unable to get regular and adequate supplies of coal, thereby jeopardizing the local gas supply.

Colonel Ashley, in his reply, said he was aware of the difficulties mentioned by Mr. Clarry. So far as they related to gas undertakings, he was informed by the Railway Company that the trouble had now been practically surmounted.

FARNHAM GAS AND ELECTRICITY BILL.

The Unopposed Committee of the House of Commons on Wednesday, March 9, considered the Farnham Gas and Electricity Bill.

Mr. Groves (Messrs. Sherwood & Co., Parliamentary Agents) said the Bill was promoted by the Farnham Gas and Electricity Company, which was incorporated in 1910 with powers to work a gas and electricity undertaking. Since then the Company had obtained a Gas Order in 1914 and another in 1926, while an Order by the Electricity Commissioners was now awaiting confirmation by the House of Commons. The reason for the Order, now pending, by the Electricity Commissioners was that the promoters, in common with most gas and electricity companies, found that, without a Special Order, they could not get borrowing powers from the Electricity Commissioners for the purpose of their electrical undertaking, nor could borrowing powers be obtained from the Board of Trade in respect of the gas undertaking. The Board of Trade and the Electricity Commissioners held that they could not grant borrowing powers in the ordinary way because they related to the combined undertaking and would be secured upon both the electricity and gas undertakings. Owing to the criticism that had been made of this position in regard to electricity, a public Act was passed in 1925 authorizing the Electricity Commissioners to make Orders in respect of borrowing powers required in such circumstances; and the Order now awaiting confirmation was made under the Act. This disposed of the difficulty so far as the electricity undertaking was concerned. With regard to gas, however, the Board of Trade was still without similar powers conferred upon the Electricity Commissioners by the Act of 1925 to which he had just referred. In 1926, the Company obtained an Order from the Board of Trade authorizing the raising of £66,000 new capital, but with no borrowing powers; and at the time this Order was granted, the Board of Trade suggested that the Company should promote a Bill in Parliament for the purpose of obtaining the necessary authority to raise money by way of loan. In this way the Company had agreed with the Board of Trade on Clause 31 of the Bill empowering the Board by Special Order under section 10 of the Gas Regulation Act, and after consultation with the Electricity Commissioners, to authorize the Company to borrow money on mortgage of the whole undertaking. The effect of this would be to put the position, as regards gas, on the same footing as it now was in regard to electricity. Under the terms of the Company's original powers, the gas and electricity undertakings were indivisible, and the borrowing powers must be secured upon the whole undertaking. This new clause, however, had never been inserted in a Bill before, and it was likely to occur many times in the future.

Referring to the Reports of the Government Departments upon the Bill, Mr. Groves said that Clause 5, giving powers to require users of internal combustion engines to provide silencers, had been taken out in accordance with a suggestion by the Board of Trade. With regard to Clause 7, relating to entry upon premises, Mr. Groves said he had taken the usual clause for gas and the usual clause for electricity, and tried to combine them to apply to a gas and electricity undertaking; but he had not been successful, so he had put in separate clauses for gas and electricity, both of which were in accordance with precedents. Clause 9, relating to expenses of reconnecting a discontinued supply of electricity, had been struck out of the Bill, because provision was made for this in the Electricity Supply Act of 1926. In connection with Clause 10, which provided that the Company might supply gas or electricity to premises partly within and partly without the area of supply, the Ministry of Transport stated that this could be done under the present law, while the Board of Trade suggested that it should only be done by arrangement between the undertakers and the undertakers authorized to supply in the adjacent area. Mr. Groves suggested that such a provision as that proposed by the Board of Trade was entirely unreasonable.

The Chairman: You need not worry further about that. We will agree to the clause.

Mr. Groves then referred to Clause 18, which, he said, was taken from the Barnet Act of last year, and enabled the Company to sell its capital without the usual auction under certain conditions. Clause 21 provided that the additional capital of £70,000 authorized by the Bill should form part of the general capital, but the Ministry of Transport had raised a point that some other arrangement should be made, because, as the price of gas only was regulated by the sliding-scale, it was possible for the Company to apply profits made on electricity to the reduction of the price of gas. It was suggested by the Ministry that a provision similar to that in the Oakham Gas and Electricity Bill should be inserted. This was a case of a Gas Company authorized in 1888 to supply gas, and subsequently authorized in 1923 to supply electricity; and it was provided that the two undertakings must be kept entirely separate. In the case of Farnham, however, the undertaking had been started as a combined undertaking, and the whole of the capital had been raised on that basis. If the basis were altered in the manner suggested, he did not know how the Board could face their shareholders, or how it would affect the business of the Company. The Directors were alarmed at the suggestion, because if given effect to they did not know how they were going to raise their £80,000. He asked that the suggestion of the Ministry of Transport should not be adopted.

The Chairman said that if this had been the case of a company starting afresh, the Committee might have adopted the suggestion of the Ministry; but in this case they would not.

The preamble of the Bill was then proved, and it was ordered to be reported for third reading.

READING GAS BILL.

This Bill, promoted by the Reading Gas Company, was before the Unopposed Committee of the House of Commons on Wednesday, March 9.

Mr. F. E. Cooper (Messrs. R. W. Cooper & Sons, Parliamentary Agents) said that one of the objects of the present Bill was to authorize the Company to acquire some land belonging to the Great Western Railway Company, for the purpose of the erection of a gasholder. There would be no manufacture of gas on the new site. The reason for coming to Parliament in connection with this matter was to obtain legal powers to use the land; there being some question as to whether there might be pre-emption rights on the part of the original owners. The Great Western Railway Company purchased the land in 1850, but had agreed to sell to the Gas Company subject to this Bill being passed. Another object of the Bill was to raise new capital. Originally £200,000 additional capital was asked for with the usual half borrowing powers; but after negotiations with the Reading Corporation, the amount had been reduced to £170,000, and £85,000 borrowing powers. The Board of Trade, continued Mr. Cooper, had reported with regard to Clause 27 dealing with the charge to be made in the case of a stand-by supply of gas or electricity. In the deposited Bill a minimum charge of 25s. per quarter was suggested, but after discussion with the Reading Corporation this had been reduced to 20s. The Board of Trade, however, had suggested that a similar clause to that used in the case of electricity supply should be adopted. In that case arbitration was provided for, and the promoters in this case regarded their clause as a much more simple and workable one. The local authority had agreed, and, moreover, the Company could agree with the consumer to a less charge than 20s. if it was thought desirable to do so.

The Committee agreed that the clause as proposed by the promoters should remain in the Bill; and Mr. D. H. Helps, the Engineer and Manager, having proved the preamble, the Bill was ordered to be reported for third reading.

The members of the Royal Artillery Association (Halifax Branch) have visited the Halifax Corporation Gas-Works, by permission of the Gas Committee and the General Manager (Mr. W. B. McLusky). The party were conducted over the plant by Messrs. Leach, Howley, and Owen, members of the works staff. Hearty thanks were subsequently accorded Mr. McLusky and the guides.

MISCELLANEOUS NEWS.

NEWCASTLE-UPON-TYNE AND GATESHEAD GAS COMPANY.

ANNUAL MEETING.

The Annual Meeting of the Company was held on Tuesday, Feb. 22—Mr. J. E. COWEN, Chairman of Directors, presiding.

The CHAIRMAN, in moving the adoption of the report and accounts, said that, unless a drastic change in the administration, or maladministration, particularly of the Poor Law, took place, rates threatened to become such a charge on industry in this district that, far from new industries being started here, those already in existence would be stifled. No competitive industry could go on bearing rates at the rate of 28s. and 30s. in the pound, which were the figures now prevailing in some of the outlying districts. To sum up the accounts, coals had cost £105,000 more than in 1925, and residuals had yielded £63,000 more, leaving a net increase in the cost of coal, less residuals, of £102,000. The receipts from gas and rentals had yielded £19,000 more, and net reductions on other items of expenditure represented about £6600, leaving £76,600 less gross profit than in 1925. To meet this position it was proposed to draw upon the reserve fund to the extent of £30,000, and to carry £30,000 to a coal suspense account. Then, after providing for interest on the debenture stock and loans and for the preference dividend, and paying a dividend at the authorized rate of 5 p.ct. per annum on the ordinary stock, there would be left the sum of £29,283 to carry forward in 1927, as against £49,248 brought in from 1925.

At the commencement of the mining dispute the Directors decided to do their utmost to give full supplies of gas throughout their area, no matter how long the dispute might last and no matter how much it might cost. The dispute lasted much longer than anyone expected; and though they had at the commencement large stocks of coal, it soon became evident that it would be necessary for them to purchase foreign coal. There were many anxious times, especially when stocks became low, as to whether the coal purchased from abroad would arrive in time for their requirements; but he was glad to say they carried through. The American coal they received was of good quality, but the European coal was mostly very inferior stuff.

It would be noticed that the sale of gas for the year showed an increase of 2½ p.ct. only. It might be thought that, owing to the reliance which the public placed in gas during the strike, and the use they made of it, the increase would have been greater; but it must not be forgotten that in their area they had a considerable industrial demand, and the depression in trade caused by the coal stoppage counteracted to a large extent the greater domestic demand.

NO INCREASE IN GAS PRICES.

At the last meeting he indicated that if there was no disturbance of economic conditions by labour troubles in the coalfields or elsewhere, it would not be necessary to make any change in the price of gas during 1926. There had, of course, been serious labour troubles in the coalfields, with the effect on their accounts he had just indicated. Such results would certainly have justified the raising of the price of gas; and most of the gas undertakings in the country—municipal and companies—had increased their prices substantially. This, however, was a matter which each undertaking had to decide for itself according to local conditions. The Directors of their Company, having in mind the exceptional trade depression from which this district had suffered during the last few years, and the consequent position of a large number of their customers, decided not to make any increase in the price of gas, in the belief that they would thereby be helping the individual to tide over the crisis and also the industries of the district to recover their lost trade. He believed that the local authorities, as well as the consumers throughout their area, greatly appreciated the decision of the Directors; and he ventured to think that the shareholders would have no cause to regret it in the long run.

During the year they had again supplied large quantities of additional gas consuming appliances—viz., 10,000 fires, 6000 cookers, 3000 wash-boilers, and 9000 lighting fittings, other than burners. The increases in the sale of gas and gas appliances in the Wallsend and Chester-le-Street districts had been very satisfactory—larger, in fact, than in their old district. Last month they opened a new showroom in the centre of Wallsend, which would be a convenience to their consumers there, and would, they felt confident, result in increased business. They had also opened a furnace room in Newcastle, where demonstrations and tests of heating materials for various processes could be carried out. They would welcome the opportunity of carrying out tests for any manufacturer; and while they believed that the advantages of the use of gas—its constancy and controllability—for industrial processes were not sufficiently well known, they would certainly not advise its use for any process which they did not think would be beneficial to the consumer. With regard to coke, they had to meet very keen competition from the coke ovens in the district; but they were taking steps to improve the quality and the facilities for the use of their coke.

NEW LEGISLATION.

The Government had promised to introduce new legislation with a view to giving greater commercial freedom to gas undertakings; and while this would not be included in the business of the present session, it would likely be introduced next session. They greatly needed relief from many restrictions that hindered their commercial development; and when they got this, there would be a still brighter outlook for the industry. As yet they did not know what the Government proposals would be; but what they wanted, and ought to have, was greater freedom in the amount and the method of issue of their stocks, and power to hold shares in other gas undertakings and other cognate undertakings. They also required greater latitude with regard to their methods of charging for gas, so that they might be in a better position to meet competition. Further, with regard to dividend, they wanted what had been granted in London—viz., that, while the principle of the sliding-scale was maintained, a minimum rate of dividend was specified. Gas stocks had not recovered on the market from the ungenerous treatment the industry received during the war, and nothing would recreate the confidence of the investing public in them short of a minimum dividend.

The CHAIRMAN then moved that final dividends be paid for the year ended Dec. 31, 1926, as follows: 2 p.ct. on the 4 p.ct. preference stock, making 4 p.ct. for the year; and 2½ p.ct. on the ordinary stock, making 5 p.ct. for the year.

Lieut.-Col. RITSON seconded the resolution, which was carried unanimously.

LEA BRIDGE DISTRICT GAS COMPANY.

ANNUAL GENERAL MEETING.

The Annual General Meeting of the Company was held on Tuesday, March 8, at the Offices, 63 and 64, Chancery Lane, W.C.—Mr. A. M. PADDON, M.Inst.C.E. (the Chairman), presiding.

The SECRETARY (Mr. Henry Hand) read the notice convening the meeting; and the report of the Directors and the statement of accounts for the year ended Dec. 31 were taken as read.

The CHAIRMAN, in moving the adoption of the report and accounts, said he thought the proprietors would agree with him that they were both satisfactory and self-explanatory. A good many accounts in relation to this particular year had called for explanation in detail; but those before them were singularly straightforward, and gave an accurate presentation of the state of affairs without imposing any difficulty upon those who perused them.

SATISFACTORY INCREASE IN BUSINESS.

They had had what was for them a satisfactory, but a normal, increase in business of nearly 6 p.ct., amounting, however, to over 50 million c.ft. An increase of these dimensions, coming as a sequence to such, was much more satisfactory than the spasmodic movements to which some of the larger undertakings were subject. Of course, those undertakings were glad of a large increase; but a regular increase was more to be desired than an occasional large one. In the accounts it would be seen that the Company's capital powers were all that could be wished; and the capital employed in the business in relation to its size had been improved by the period under review, because, although they had spent £9000, there had been written-out some £13,000, so that the capital per million c.ft. was now about £427, after making allowance for the amounts added on conversion, which, of course, they had never had and had never handled. This was a low figure; but he did not think one could make it lower than was conducive to, and consistent with, the favourable prospects of the undertaking. Some people thought that the capital in certain cases could be brought too low; but he hardly shared this view, unless it involved any sacrifice of the efficiency of the undertaking. He could assure the proprietors that there had been no such sacrifice here. He sometimes wished the proprietors could inspect the works, and see how excellently they had been maintained, and how admirably adapted they were for the duty expected of them. No one connected with the gas industry could fail to derive advantage from a visit to the works. Coming to the revenue account, as a corollary to what he had been saying, those items devoted to maintenance of works and plant were all ample. There was a very interesting figure in regard to carbonizing wages, which stood approximately at 2½d. per 1000 c.ft. He only knew of one case in which the figure had been less than this; and that, of course, was a criterion of works efficiency. Another item revealed the fact that they were paying 3½d. per 1000 c.ft. in rates and taxes. As one went to the East of London, one rather expected to encounter this sort of thing; and they were likely to do so in the future. But it was a very great burden on this or any other undertaking to have to meet these phenomenal charges in respect of rates and taxes, and then afterwards to provide a cheap commodity for the public. However, he thought he might say that they had succeeded in meeting the demands upon them in this respect. Another heavy burden they had had to bear was that of having to obtain adventitious amounts of coal. Coal, oil, and coke used in gas manufacture figure at some £25,000 more (coal itself costing nearly £14,000 more); and they had had to meet this additional charge in different ways—by economies, by the exercise of care, and by charging the consumers somewhat more for their gas. When, however, they looked on the other side of the account, and saw that the charges had been based upon 9½d. and 10½d. per therm—the latter being the maximum amount charged—they would realize at once

that this maximum charge would not be excessive in their circumstances as a normal one; and it fell very far short of what more important undertakings in the Metropolis had been compelled to impose in order to meet similar obligations. He was glad to be able to announce that there would be a decrease in the price of gas at the end of the current month of ½d. per therm; and it was the full intention of the Board, in the absence of unforeseen circumstances, to make a still further reduction in June of another ½d. per therm, which would bring them back to the charge of 9½d.—which he was sure everybody would agree was a low figure in respect of their scale of operations and the circumstances in which they administered their business. There had been transferred from the revenue account to the benefit fund £1666, whereas they had only taken out £706. It was of great importance that this fund should appear in dimensions that would satisfy those who had expectations from it; and aggregating, as it did, £8000, of which £7000 was invested by way of special deposit, it was of a most reassuring character. Further, it would be noted that they had carried to the special purposes fund a sum of £1700, which was abnormal, because in a large number of instances quite successful undertakings had reversed the processes, and taken a good deal out of their special purposes funds. It was certainly a happy augury that the Company should contrive, in such a time of difficulty, to augment a fund which existed really for the object of supplementing their finances in such circumstances. Last, but not least, on the expenditure side of the revenue account was the co-partnership contribution, amounting to £2387. Having regard to what they all went through last year, no one, he ventured to say, would begrudge this money or minimize its effect. It had yielded very much what had been anticipated, and in some ways more than had been anticipated. It had promoted perfectly satisfactory relations between the Company and their employees. Their co-partners owned something like £11,000 of the Company's stock. This certainly was not the sort of thing that existed when he began his association with the gas industry many years ago.

The Year's Results.

In the result, the expenditure on revenue account had been very heavily increased—namely, by £28,089; but the moderate increase in the price of gas, with the increased quantity sold, had brought in £15,343 more, and residuals had responded with an additional £9156. Thus they had augmented receipts to the extent of £24,490, to set against the figure he had just mentioned by way of increased expenditure; and the profits, as compared with a year ago, were reduced by £3600, leaving them with £25,465 to carry forward. In the profit and loss account, they saw that these profits, together with the amount brought into account, were sufficient to meet all their requirements; and they carried out of the profit and loss account, at £20,520, £130 more than they brought in. This was an excellent result. In fact, they had done better than any of them had been legitimately entitled to expect. The whole of the strike difficulty, too, had been liquidated, with the exception of a very small amount of dear coal—to the extent of £2500—which they were carrying forward; and the means of dealing with this lay very easily within their financial compass. Turning to the balance-sheet, there would be found some satisfactory figures. One item showed that they had made provision in a retorts renewal fund of over £11,000. This fund was established a good many years ago, when they were not so confident as now of the efficiency of their vertical retorts. These retorts had, however, served them very well; and so this provision remained to the good. On the credit side, investments appeared at £47,000; and in addition there was the benefit fund on deposit, which could be invested. This £47,000 was the nominal value; but a note showed that the value of the investments was nearly £50,000 at the time of closing the accounts. Further, they had on deposit account some £21,000; so that, in comparison with many undertakings at the end of this unhappy year, they were opulent to a degree.

Prospects Extremely Good.

Speaking generally of their business, he thought he might say, speaking with a fairly long experience of the gas industry, that the prospects of the Lea Bridge District Gas Company were extremely good. They did business with just those elements in the community to whom gas was of the greatest value. Their prepayment business was a very large and important branch of the undertaking. In fact, it was the largest portion of the business. Their prepayment meter users amounted to 61 p.ct. of the total body of consumers. Nearly 50 p.ct. of the gas was sold in this way; and they received from the prepayment consumers some 54 p.ct. of their total gas revenue. This would tell them that the main foundation of the undertaking was based on the prepayment consumer; and this was a matter upon which they might congratulate themselves. In the first place, the prepayment consumer thoroughly understood the value of gas, and used just what he required. It was true he paid for it in a sense before he got it; but this made him all the more careful in detecting, and immediately putting a stop to, any waste. With the ordinary quarterly consumer, this was not the case. He was using gas "in the dark," as it were, for a considerable portion of the time. He was only apprised of waste at the end of the quarter, when the bill came in. Generally speaking, there was no such good feeling between the ordinary consumer and the undertaking as there was between the prepayment consumer and the Company. The prepayment consumer had control of his relations with the undertaking, in a way that the ordinary consumer had not. In fact, the popularity and stability of their business depended very largely upon the collection of money at short intervals, which allowed the consumers to acquire a true and accurate knowledge of his position before it was too late. He was saying this because he thought the gas undertakings of the country would to a great extent have to consider carefully, if they wished to go on increasing and further popularizing their business, whether the system of quarterly charge was not a mistake. Before the war, it did not matter so much as to-day, because gas was then very cheap. But the price of gas under the most favourable conditions being what it was now, the quarterly account was not going to help sales. Continental gas business was based on collections at short intervals, which, while they may obscure from the consumer the importance of his gas account, afforded him facility for paying it and the means of adjusting it to his personal needs as he went along, before he was committed to an extent which he might not be prepared to meet.

The Deputy-Chairman (Mr. G. W. Carey) seconded the motion for the adoption of the report and accounts; and it was carried unanimously without discussion.

Dividend, Re-Elections, and Thanks.

On the proposition of the Chairman, seconded by Mr. J. M. Miles, dividends were declared for the half-year ended Dec. 31 at the rates of 5 p.ct. per annum and 6 p.ct. per annum on the preference stocks, and 6½ p.ct. per annum on the consolidated ordinary stock, all less income-tax.

The Deputy-Chairman proposed the re-election of Mr. A. M. Paddon as a Director. He said that Mr. Paddon's great attainments, and his manifold qualifications for the office he held, were so well recognized throughout the gas industry that it was not necessary for him to enlarge upon them. But he would like, particularly on this occasion, to pay a small tribute to the work Mr. Paddon had done, and the way in which he had helped to achieve the results attained by the Company. It had been a very difficult year for everybody concerned; but their ship had been steered through the troubles waters as well as any, and much of the credit for this was due to the captaincy of Mr. Paddon.

Mr. E. L. Burton seconded the propositon, which was agreed to.

The retiring Auditor (Mr. R. E. Gisburne) was re-appointed, on the motion of Mr. W. B. Farquhar, seconded by Mr. F. W. Church.

The Chairman proposed a hearty vote of thanks to the officers, staff, and employees of the Company, for their services during the past year. In Mr. F. W. Cross, he said, they had a General Manager of exceptional merit, who had been associated with the undertaking for 32 years, and who, all through his career, had shown not only conspicuous ability, but tireless devotion to the Company's interests. In Mr. D. Cleave Cross, again, they had an Engineer and Works Manager who had been well trained by his father, and of whom the Board had formed the very highest opinion. Mr. Hand, the Secretary, enjoyed the complete confidence of the Directors. He had been with the Company for many years, though only recently appointed Secretary.

Mr. Lawrie Trewby, who seconded, said he had known Mr. F. W. Cross for 25 years, and was well aware, as were all his professional brethren, how sound an engineer he was. He was fortunate, too, in having a brilliant son to follow him.

Mr. F. W. Cross, acknowledging the vote, which was heartily passed, said it was impossible to carry on an undertaking of this kind without the ready co-operation of the whole of the staff and workmen. Among all those in the service of the Company there was a wonderful spirit of loyalty.

Mr. Hand also briefly returned thanks; and the proceedings were brought to a close by a vote of thanks, proposed by Mr. Church, to the Chairman and Directors.

KOPPERS CONTINUOUS VERTICAL CHAMBER OVEN.

The Chapel Whaley and District Gas Company have recently placed with Koppers Coke Oven Company, Ltd., of 301, Glossop Road, Sheffield, an order for the first installation of Koppers continuous vertical chamber ovens to be erected in this country.

The installation will consist of two units, each of two chambers. Each chamber will deal with 12½ tons of coal per day, and the plant is capable of producing 800,000 c.ft. of gas per day. The ovens are heated by producer gas generated in outside producers of the Koppers type, two of which are to be supplied. Only one producer is needed for heating the plant; the other being a stand-by.

Six installations of these ovens, with a total capacity of 5,040,000 c.ft. of gas per day, have been built on the Continent, and are working highly successfully. It is claimed that the Koppers' continuous vertical chamber oven gives a high yield of gaseous therms, requires only a low fuel consumption, and is operated with exceptionally low labour costs. Perhaps the most important advantage of the oven is that it can be operated with any class of coal without the slightest danger of sticking of the charge. Owing to the employment of outside producers, the producer gas can be purified, and in consequence there is added to the other advantages that of longer life of the setting.

The new installation will be watched with considerable interest by gas engineers in this country.

Street Lighting at Bridgetown, Bardados.

A meeting of the Vestry of St. Michael was held on Feb. 17 to consider the award of a contract for street lighting in Bridgetown. There was conflict of opinion as to whether the whole contract should be given to the Electricity Company, or whether the Gas Company should be allowed to tender. Mr. Braithwaite supported the principle that the contract should be divided. Other members of the Vestry thought that the lowest tender should be accepted. The Gas Company's tender was: For the area at present lighted by them, $640 per month for one year; $622 per month for five years. The Electricity Company tendered: (1) For the whole area, $957 per month for five years; (2) for the area at present lighted by them, $598.50 per month for five years. A long discussion ensued, and eventually it was decided that both Companies should be awarded contracts for the lighting of their respective areas for five years. Following this announcement, however, the Electricity Company (the Barbados Electric Supply Corporation, Ltd.) cancelled their tender. Members of the Vestry have decided to obtain legal opinion whether this withdrawal is legitimate. The present contract will expire this month, and there is a possibility of Bridgetown being half in darkness if the Vestry refuse to be bullied by the Electricity Company.

GAS COMPANIES' RESULTS FOR 1926.

Alnwick.

At the annual meeting of the Alnwick Gas Company, Mr. R. Kyle, the Chairman, said that, though the sales of gas had again exceeded those of any previous year, all demands had been met without any reduction of quality or pressure. Owing to the coal strike, the Company were compelled to advance the price of gas from the last quarter of the year, but he confidently anticipated a reduction from the termination of the March quarter. Final dividends were declared, making the distribution for the year 12¾ p.ct. on the "A" stock, 9¾ p.ct. on the "B" stock, and 6 p.ct. on the "C" stock.

Altrincham.

At the annual meeting of the Altrincham Gas Company, Mr. W. W. Baker, the Chairman, said that, owing to the coal strike, it had been necessary to raise the price of gas by 1d. per therm last September, and again by 1d. per therm in December. The Board hoped that by the end of March they would be able to make a material reduction in the price. Mr. Baker dealt in detail with the accounts of the Company, and afterwards referred to the Manchester Corporation Bill, by which, he said, the City Council proposed to extend their boundaries, and sought powers, in the event of such extension, to acquire such part of the Gas Company's undertaking as was in the township of Baguley within their area of supply. The matter was being carefully watched by the Directors; and they were advised that the Company's interests were amply protected. The accounts were adopted, and the usual dividends declared.

Bath.

A further increase in the output of gas was experienced by the Bath Gas Light and Coke Company during 1926. To meet the additional cost of coal owing to the miners' strike, the price of gas was increased from 6d. to 7d. per therm for the December quarter; and notice was given of a further increase of 1d. per therm from the reading of the meters for the December quarter. It was, however, found unnecessary to bring this into operation. The dividend is 5 p.ct. per annum, less income-tax.

Brentwood.

Dividends of 8 p.ct. on the ordinary stock and £5 12s. p.ct. on the additional stock are being paid for the past year by the Brentwood Gas Company; and there will be a balance of £2990 to be carried forward. The sale of gas shows an increase of 4·63 p.ct. over 1925.

Cambridge.

The Directors of the Cambridge University and Town Gas Light Company recommended dividends at the usual rates for the half-year ended Dec. 31. It was necessary to advance the price of gas at Michaelmas last from 9d. to 10d. per therm.

Dartmouth.

With a balance, subject to income-tax, available for distribution of £1682, the Dartmouth Gas, Coke, and Coal Company, Ltd., are paying for the past year a dividend of 10 p.ct. on the ordinary shares, less tax. After carrying £100 to the general reserve fund and £100 to the reserve for repairs, renewals, and extension of works and plant, a balance will remain to be carried forward of £572.

Dover.

A full and efficient supply of gas was maintained by the Dover Gas Company throughout the stoppage, though the price had to be increased, due to the cost of foreign coal. The revenue account showed a profit of £10,679, which, after payment of interest and income-tax, with the balance from 1925 left an available sum of £11,815. A dividend was declared of 3¾ p.ct., less tax, making, with the interim dividend, the full statutory dividend of 7½ p.ct. for the year.

Eastbourne.

Owing to the coal strike the Directors had to increase the price of gas, as from October, by 1·6d. per therm. After payment of interim dividends and other charges, there remained a balance of £18,812 at the credit of the profit and loss account. At the annual meeting the following final dividends were declared—8¾ p.ct. per annum on the £65,000 "A" stock, 6¾ p.ct. on the £198,000 "B" stock, and 5 p.ct. on the £3150 5 p.ct. preference stock. A balance of £9370 was carried forward. Mr. Caleb Diplock, the Chairman, said there had been an increase in gas sales of nearly 6 p.ct.

Gloucester.

Towards meeting the increased expenditure due to the cost of foreign coal, the price of gas was raised from 8·387d. to 9·032d. per therm, taking effect as from the last readings of the meters for the September quarter, and a further increase was made later. The Directors record that a full supply of gas was maintained throughout the coal stoppage. The sale of gas for the year showed an increase of 29,733,000 c.ft. An interim dividend for the six months ended June 30, 1926, at the statutory rate, was paid; and the Directors recommended the payment of the maximum statutory dividend of 5 p.ct. per annum (less income-tax) on the consolidated ordinary stock of the Company for the half-year ended Dec. 31.

Guildford.

An increase in the sales of gas during the past half-year of over 14 p.ct., as compared with the corresponding period of the previous year, is reported by the Guildford Gaslight and Coke Company. The Company did not increase the price of gas at all during the coal stoppage, or at the December quarter; but carried on with a full supply, and without variation in quality or pressure. During the coal stoppage they sold and fixed 519 cookers, fires, and geysers, connected 235 new consumers, fitted-up 123 slot installations, and extended their main and gave a supply to the village of Shere, about 7 miles from Guildford. They also installed a 1 million c.ft. per day Humphreys & Glasgow carburetted water gas plant, which was of great assistance in meeting the heavy increase in consumption. In spite of lower profits, the usual dividends are being paid, as the heavy increase in consumption is still maintained.

Hartlepool.

The payment of a dividend of 5 p.ct., less income-tax, for the year 1926, leaves the Hartlepool Gas and Water Company with a balance of £6292 to carry forward. Not only was the supply of both gas and water for domestic purposes well maintained throughout the coal stoppage, but an increased demand for over 40 million c.ft. of gas was met, as compared with the previous year. Over 2000 additional cookers and fires were fixed during the year.

Hastings and St. Leonards.

Strong criticism of the Corporation electric light undertaking, and a plea for fair competition, were advanced by Mr. W. J. Glenister, the Chairman of the Hastings and St. Leonards Gas Company, at the annual meeting. Referring to a marked decrease in the Company's contract for public lighting, Mr. Glenister said he was very reluctant to indulge in any criticism of the electric light undertaking, but he felt very strongly in this matter. The undertaking was the property of the ratepayers, represented by the Corporation, who had apparently drawn a line dividing themselves into two separate entities. They were going to supply themselves with electricity, and fix their own price at which they would supply it! It was like living by taking in each other's washing. No man in his senses would dream of conducting a business on those principles. The electricity undertaking estimated the revenue from public lamps at £9000. Current was now sold very cheaply—as, for instance, at Bexhill—at under the average working cost, except for public lighting. Charges had been reduced to all classes of consumers, except charges for current for public lighting, to pre-war level or under. Before the war, the charge was 2d. a unit; it was now 3d. If current were charged for public lighting at the rate of 2d. per unit, the revenue for next year would be £6000 instead of £9000. It was merely a case of "robbing Peter to pay Paul," declared Mr. Glenister; and the ratepayers were paying for it. Even the Gas Company were paying for it, whether they used electricity or not. They recognized that it was reasonable for the town to favour its own concerns; but they considered this to be an unfair way of trading, and felt bound to take exception to it. After referring to the expressions of admiration and goodwill for the Gas Company voiced by the Mayor of Hastings when speaking at a dinner in London recently, Mr. Glenister said: "We see no reason why these two undertakings should not run side by side on proper lines, without any hostility at all on the part of either. It must be in the interest of the town for this Company to be maintained." The report submitted recorded progress in all departments of the Company's business; and it was announced that practically all the Company's employees are now co-partners. Dividends were declared at the rates of 6¾ p.ct. per annum on the 5 p.ct. converted stock, 5¼ p.ct. on the 3½ p.ct. converted stock, and £6 4s. 6d. p.ct. on the 5 p.ct. additional stock.

Isle of Thanet.

Presiding at the annual meeting of the Isle of Thanet Gas Light and Coke Company, Mr. Walter Hills, the Chairman, said that the loan capital had been increased by the issue of 5 p.ct. debenture stock of the value of £19,929. The capital per million c.ft. of gas sold still stood at the low figure of £388. The year had seen the completion of a second installation of Woodall-Duckham continuous verticals, in substitution for inclines. This installation was in full operation, and was giving splendid results. The supply of gas was fully maintained throughout the coal strike; but the price was raised from 9d. to 11d. per therm. A dividend of 7 p.ct. per annum, less the interim dividend, was declared. The large type retorts referred to were described and illustrated in the "JOURNAL" for Jan. 5, pp. 32-4.

Narborough and District.

An increase of 7 p.ct. in the sales of gas for the past year is recorded by the Narborough, Blaby, Enderby, and Whetstone Gas Light and Coke Company, Ltd. A considerable amount of extensions and renewals has been carried out, both in the works and on the district, to meet the ever-increasing demand for gas. A final dividend is being paid on the ordinary shares of 2s. 6d. per share, together with a bonus of 1s. 3d. per share, less tax. After transferring £200 to the renewals fund, the sum carried forward is £6160.

Penistone.

A dividend of 10 p.ct. for the past year is being paid by the Penistone and District Gas Company; and after placing £300 to the reserve fund and £165 to the special purposes fund, the balance carried forward is increased by £251. The quantity of gas sold during the year was 143 million c.ft., representing an increase of 4·88 p.ct. over the previous twelve months. The average cost of coal for the year was 29s. 3d. per ton; while the receipts for residuals were 16s. 7d., making the net cost of coal 12s. 8d. a ton. The sale of gas per ton was 60 therms.

Redhill.

The sale of gas shows an increase of 7·69 p.ct. During the year, £35,340 of 5 p.ct. debenture stock was issued at an average price of £96 5s. 10d. The coal strike made it necessary to purchase large quantities of foreign coal at greatly enhanced cost; and this, in turn, made a temporary increase in the price of gas unavoidable. Though this took place as late as October, the consumers have already been notified of a reduction of 1d. per therm as from Jan. 1, to be followed by a further 1d. reduction as from the reading of the meters for the March quarter. Dividends at the following rates were paid for the half-year to June 30: 6 p.ct. on the cumulative preference stock,

5½ p.ct. on the preference "A" stock, and 5¼ p.ct. on the ordinary "B" stock, all less income-tax. At the annual meeting similar dividends for the second half-year were declared on the cumulative preference and preference "A" stock, and 5 p.ct. on the ordinary "B" stock. The Chairman, Mr. W. Lees Stenning, J.P., said that throughout the strike the price of gas was maintained at the normal standard. During the year they had commenced the erection of showrooms and district offices at Walton-on-the-Hill.

Romford.

At the half-yearly meeting of the Romford Gas and Coke Company, it was reported that the business of the Company is expanding; the sales of gas for the year being 321⅛ million c.ft., and the number of additional consumers 863. Dividends were declared of 7½ p.ct. on the original shares, 5¾ p.ct. on the "B" shares, 3 p.ct. on the 6 p.ct. preference shares, and 2¾ p.ct. on the 5½ p.ct. preference shares, all less income-tax. This absorbed £8315 out of an available balance of £10,683, and left £2367 to be carried forward to the credit of the current half-year. Mr. B. J. Smith, the Chairman, explained that it had been necessary to increase the price of gas last October, but this had since been reduced by 4½d. per 1000 c.ft.

Sheppey.

An increase in the sale of gas over 1925 of 11·2 p.ct. is recorded for the past year by the Sheppey Gas Company. The coal stoppage necessitated an increase in the price of gas from Sept. 30 by 1d. per therm; but this advance has been removed, after having been in operation for three months only. The dividend on the consolidated ordinary stock is at the rate of 5 p.ct. per annum, less income-tax.

Shanklin.

The Directors' report for the year ended Dec. 31 last showed that the balance standing to the credit of the profit and loss account was £8160, subject to the payment of a dividend; and the Directors recommended a dividend of 4½ p.ct. for the half-year, making 7½ p.ct. for the year, less tax. This dividend was declared at the annual meeting, when Mr. R. R Russell, J.P., Chairman of Directors, stated that the increase in gas sales amounted to 10·6 p.ct. A new spiral gasholder was brought into use during the year, and contracts had been placed for the erection of a further spiral-guided holder, and for a carburetted water gas plant. The latter plant had proved of great value during the coal strike.

Swindon.

At the annual meeting of the Swindon United Gas Company gratifying progress was reported, notwithstanding the coal strike. The balance-sheet showed a profit of £4030; and the usual dividends of 4½ p.ct. on the preference shares and 5¼ p.ct. on the consolidated ordinary stock were declared. The Chairman said that early in the year the Directors had contemplated reducing the price of gas, but the coal strike had put this out of the question. The total increase in the sale of gas was 23 million c.ft.

Tunbridge Wells.

Presiding at the annual meeting of the Tunbridge Wells Gas Company, Mr. H. A. Beeching, the Chairman, said that during the first four months of the coal strike the Directors hoped they would not have to raise the price of gas. However, it was necessary to do so by 1d. per therm at Michaelmas and 1½d on Nov. 5. The Directors announced that, from the reading of the meters in March, there would be a reduction of 2d. per therm, bringing the price to 10d. The gas sold during the year was 485 million c.ft.—an increase of 4¼ p.ct. The net result of the year's working, after paying interest on loans and dividend charges, amounted to £12,596, to be carried forward to the next account. The following dividends were declared: 13¼ p.ct. per annum on the consolidated ordinary stock, 11 p.ct. on the consolidated "B" stock, and 10¼ p.ct. on the "C" and "D" stocks.

Tynemouth.

Moving the adoption of the report and balance-sheet at the annual meeting of the Tynemouth Gas Company, Mr. Thomas Young, Chairman of Directors, referred to the coal dispute, and said that in the case of the Tynemouth Company the consumers were not called upon to pay any higher price for gas until January last, when the extra charge of 1d. per therm (equivalent to nearly 4¾d. per 1000 c.ft.) came into operation. The additional charge of 2d. per therm during the current quarter would be presented for collection next month, after which they intended to make the substantial reduction of 2d. per therm. It was gratifying to be able to point to another record in sales; their total gas sold amounting to 2,776,186 therms or 590,678,000 c.ft., which represented an actual increase over the previous year of 1·82 p.ct. This satisfactory result was indicated on the credit side of their revenue account, which showed that the total turnover for gas and rentals amounted to £124,646, or an increase of £5953 over 1925. The net revenue from residuals amounted to £26,607, compared with £22,398 in 1025, though, on the other hand, this only represented 43 p.ct. of their coal bill, as compared with a pre-war average of 80 to 90 p.ct. Turning to the other side of the revenue account there were some remarkable figures caused by the abnormal conditions prevailing in the latter part of the year. Coals and enrichment had cost them £61,354, compared with £42,519 in 1925—an increase of £18,835. The report was adopted, and dividends for the first and second half-years at the rate of 5 p.ct. per annum on the consolidated and the new ordinary stock, less income-tax, and at the rate of 4 p.ct. on the new preference stock, less income-tax, were declared.

Woking.

The Woking District Gas Company report that, in comparison with the half-year ended Dec. 31, 1925, the quantity of gas sold in the past six months shows an increase of 13¾ million c.ft., or 20·55 p.ct. There has been a gain of 132 consumers. A dividend, less income-tax, is recommended for the half-year at the rate of 6 p.ct. per annum on the "A" and "B" ordinary stocks.

BY APPOINTMENT

A useful domestic Combination Gas Cooker

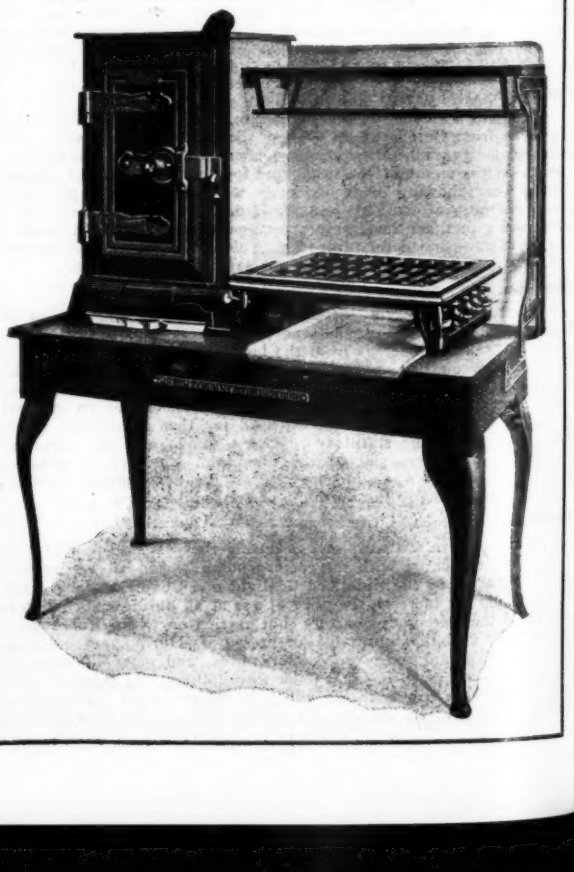
consisting of Roasting and Baking Oven, and Hotplate on Stand. Baking Oven is externally and internally made of porcelain-enamelled sheet steel linings, complete with swing hangers, grid shelves, etc. Hotplate is constructed of cast-iron front, one side of hob polished, fitted with boiling, simmering and grilling burners, grill pan, grid and porcelain tray, cast-iron top bars fitted to hotplate, porcelain-enamelled back plate and plate rack, the whole mounted on cast-iron stand, having cast-iron curtain all round.

¶ *Write for No. 6c Gas Appliance Booklet—a supply may be had with your name—free.*

CARRON COMPANY Works: CARRON, STIRLINGSHIRE.

Branch Works—Phœnix Foundry, Sheffield.

Showrooms:—LONDON—15, Upper Thames St., E.C.4, and 50, Berners St., Oxford St., W.1; LIVERPOOL; GLASGOW; EDINBURGH; BRISTOL, etc.



GAS REGULATION ACT APPLICATIONS.

SPECIAL ORDERS.

Hinckley Urban District Council.

To extend the limits for the supply of gas to include the parishes of Barwell and Earl Shilton; to empower the Council to purchase by agreement the undertaking of the Earl Shilton Gas Light and Coke Company, Ltd.; to confer further powers upon the Council in regard to their gas undertaking; to establish the thermal basis of charge; to fix maximum prices; and to enable the Council to borrow money.

Redditch Gas Company.

To empower the Company to purchase the undertaking of the Studley Gas, Coal, and Coke Company, Ltd., and to use scheduled land for gas purposes.

Stroud Gas Light and Coke Company.

To authorize the Company to raise additional capital; to establish profit-sharing; and for other purposes.

DECLARATIONS OF CALORIFIC VALUE.

Croston Urban District Council.—600 B.Th.U. (April 1.)

Lea Bridge District Gas Company.—500 B.Th.U., in place of 475 B.Th.U. (June 15.)

GAS REGULATION ACT ORDER.

We have received from the Director of Gas Administration a copy of the following Order made by the Board of Trade under section 1.

Warrington Corporation.

After the declared date, the maximum price in respect of gas supplied by the undertakers shall be:

(i.) Within the borough of Warrington, 13·2d. per therm.

(ii.) For all places beyond the borough of Warrington, a price exceeding the price for the time being charged within the borough by not more than the following amounts:

—	Maximum Additional Charge per Therm.
For all places within 1 mile of the boundary of the borough, measured in a direct line	2·4d.
For all places within 2 miles of the said boundary, measured in a direct line	3·6d.
For all places within 3 miles of the said boundary, measured in a direct line	4·8d.
For all places within 4 miles of the said boundary, measured in a direct line	6·0d.

Provided always that if payment be made within one month after the delivery of the half-yearly account, the undertakers shall make a deduction by way of discount at the following rates per therm in respect of gas consumed during the half-year, either within or without the borough:

1·2d. per therm to consumers under 100,000 c.ft.

1·4d. per therm to consumers over 100,000 c.ft. and under 800,000 c.ft.

1·6d. per therm to consumers over 800,000 c.ft.

Provided, further, that all consumers of gas without the borough who consume during any half-year not less than 250,000 c.ft. of gas shall not be charged for such half-year a higher price than that charged to consumers within the borough.

This Order shall come into operation on March 12, 1927.

ROMANCE OF COAL GAS.

On March 4 a lecture was given by Mr. B. R. Parkinson, under the above title, before the Baldock Literary and Social Guild. By way of introduction, the lecturer mentioned that several persons had asked him why this particular title had been chosen. One had even inquired: "To whom are you going to marry her eventually?" There had, indeed, been some little flirtation at the Baldock Gas-Works between gas and electricity. There was a tendency throughout the country to encourage the combination of these two industries in single works, for economy in manufacture; and a scheme had been proposed and considered at Baldock. Unfortunately, the engagement was broken off; and now, when "Miss Gas" and "Mr. Electricity" met in the streets of Baldock, they walked on opposite sides.

But the real reason why the lecturer had used the word "romance" in his title was made apparent during an historical survey of the gas industry—an industry which by epoch-making inventions had from time to time taken renewed lease of life and acquired new spheres of service, and whose vitality had been constantly renewed under the stress of competition. The explanation of this lay in the sound economic basis upon which the production of coal gas rested. The carbonization of coal, involving the recovery of many valuable bye-products, was shown to be the right and natural exploitation of that which Nature had provided; and therefore the gas industry could never fail so long as the coal supplies lasted. Mention was made of an increase throughout the British Isles of 10,000 million c.ft. of gas consumed in the year 1926 over 1925.

Some experiments were shown illustrating the carbonization of gas coal, and the important invention of the aerated or bunsen burner; and these were followed by lantern pictures illustrating the main treatment of the subject. The lecturer was indebted to Mr. W. J. Liberty, of the Institution of Public Lighting Engineers, for the loan of some slides showing examples of primitive lighting up to the time of the practical discovery of coal gas by Murdoch in 1795, and culminating in the invention of the incandescent mantle by Welsbach in 1887. Some smoke-abatement slides were also exhibited, illustrating the beneficent utility of gas when used as a fuel, in reference to the purity of the atmosphere. The remaining pictures were arranged to show in order the processes of carbonization, purification, and storage of gas. Reference was made to the old-time fear of the gas-holder, now entirely absent. Gas in itself is inflammable, but not explosive; and the lecturer explained that it would be possible to take a supply pipe of air into a gasholder under pressure, with a burner, and light it, just in the same way as gas is lighted in the atmosphere.

For the benefit of younger members of the audience, it was made clear that coal gas must not be confused with the nitrous oxide gas used in dental operations. An amusing "howler" was quoted from the recent essay competition instituted by the British Commercial Gas Association. One of the entrants had waxed eloquent as follows: "Gas is a real boon for dentists' and doctors' operations; it deadens one's sense of pain, and seems like a soothing sleep."

The lecture concluded with some views of brilliant high-pressure street lighting by gas in London. The lecturer was assisted by Mr. D. M. Gibson, of the Baldock Gas Light and Coke Company; and the Chairman was Mr. Harry Phillips, one of the Directors.

COAL TRADE REPORTS.

From Our Own Correspondents.

NORTH-EAST COAST.

Dull conditions again prevailed last week, and the market closed with buyers still unwilling to operate at colliery prices. Collieries are making a firm effort to maintain quotations, and their contention that they are down to cost price and even a little below is confirmed by the fact that many are having idle days. Idle time is so costly that it is not used for mere propaganda purposes, as is often alleged.

Home demand for gas coals is on a better scale, and producers of good brands are fairly comfortably situated. Inquiries for all kinds continue in good numbers from abroad; but competition with Continental producers is very keen, and in many cases they are obtaining orders which we cannot touch for price, although consumers may be willing to pay something extra for our quality.

Collieries and exporters are very hopeful that the worst has been seen. Inquiries have begun to come in for the coaling stations, which is regarded as a good sign, and reports from other districts are decidedly better. But at present it is a struggle from day to day to keep the pits working, and forward business is negligible.

Wear Special gas makes are quoted at 18s. f.o.b., and best qualities 17s. 6d. to 18s. Seconds are 15s. 9d. to 16s. Durham coking is weak and plentiful at 15s. to 15s. 6d. Coke is still in good demand, and there is ample trade to absorb the production of all kinds. Gas makes are quoted at 23s. 6d. f.o.b., and patent foundry at about 26s. to 27s.

YORKSHIRE AND LANCASHIRE.

Gas coals in Yorkshire and Lancashire are being quoted for forward contract business at prices below those ruling last year.

The demand for domestic fuel is still on the quiet side, so that with a general scarcity of export orders for screened coal many collieries are faced with shorter working hours. The industrial situation does not materially improve, and it is evident that it will be some months before there is any alteration. Some of the smaller fuels are likely to be firmer on account of the irregular working of pits.

The following are the Humber bunker and export prices, f.o.b. usual shipping ports: South Yorkshire—Hards, Association, 21s. 9d. to 22s.; screened gas coal, 22s. to 22s. 6d.; washed trebles, 23s. to 23s. 6d.; washed doubles, 20s. to 21s. 6d.; washed singles, 19s. to 19s. 6d.; washed smalls, 16s. to 16s. 6d.; rough slack, 12s. 6d. to 12s. 9d.; smithy peas, 22s. 6d. to 25s. per ton. West Yorkshire—Hartleys (f.o.b. Goole), 20s. to 22s.; washed trebles, 22s. 6d. to 23s.; washed doubles, 20s. 3d. to 22s.; washed singles, 18s. 6d. to 19s.; washed smalls, 14s. 9d. to 15s.; rough slack, 13s. 6d.; coking smalls, 12s. per ton. Derbyshire and Nottinghamshire—Top hards, 22s. 9d. to 24s. 9d.; washed trebles, 23s. 6d.; washed doubles, 21s. 3d.; washed smalls, 14s. 9d. to 15s. 6d.; rough slack, 13s. 3d. to 14s. 3d. per ton. Yorkshire, Derbyshire, and Nottinghamshire—Screened steam coal, 18s. to 20s. per ton.

MIDLANDS.

The demand for house coal has fallen very flat. Collieries, taking heed of the altered aspect of their order books, have made further reductions in quotations since the beginning of the month. The reductions, which vary from 1s. to 3s., are not general. Those collieries which on March 1 made the full readjustments which changed circumstances appeared to demand have not in all cases been forced to give further ground. The revision is something more, however, than a coming into line of collieries which had been enabled by specially good order books to defer readjustment at the opening of the month. It marks a further stage in the subsidence following the abnormal conditions created by the stoppage.

The decline applies to industrial fuel in only a very slight degree indeed the tendency of the market is in the other direction so far as slacks and blast-furnace coke are concerned. Pits have been playing one, and in some cases two, days a week, and the smaller output of slack has caused a stiffening-up of values. For good rough slacks 8s. to 10s. has been required. Beans likewise have firmed-up slightly, quotations for good grades ranging from 12s. 6d. to 13s. 6d. D.S. nuts have fetched from 15s. 6d. to 16s. 6d., and steams up to 21s.

Yorkshire and Derbyshire cokeries have notified an advance in the basis of blast-furnace coke from 20s. to 22s. at ovens for the second quarter. Pig iron production is being deterred.

REDUCTIONS IN PRICE.

The Buxton Gas Committee have decided to reduce the price of gas by 6d. per 1000 c.ft., as from the March meter readings. The new charges will be: Lighting, 3s. 6d. per 1000 c.ft.; cooking and heating, 3s. 3d.; and power, 3s.

The Chesterfield Town Council have approved of a recommendation of the Gas Committee for a reduction in price of 1d. per therm.

The price in Coleraine has been reduced from 5s. 10d. to 4s. 2d. per 1000 c.ft.—the amount of the temporary increase put on to cover the increased cost of coal during the strike. The reduction will apply to gas consumed after the meter readings taken in January last.

The Directors of the Deal and Walmer Gas Company have reduced the price of gas by 2d. per therm. The following is an extract from the "Deal, Walmer, and Sandwich Mercury" for Saturday last. "We would direct our readers' attention to a welcome reduction in the price of gas, as announced in our columns to-day. Gas consumers will remember the price was advanced 2d. per therm at the Christmas meter readings; and an explanatory note from the Directors of the Company stated that the increase was entirely due to the coal strike, and its after-effects, and that the earliest possible opportunity would be taken for reducing the price when conditions became normal. We are sure gas consumers will appreciate the welcome return to more normal conditions, which enables the Company to fulfil their promise; and will also appreciate the anxiety and successful efforts of the Board and staff in maintaining the supply of gas to the district during the long period of stoppage of British coal supplies, when thousands of tons of coal had to be brought from America and the Continent."

The Yeadon and Guiseley Gas Company, on March 7, reduced the price of gas, as from the meter readings for the half-year ended Dec. 31 last, by 0·8d. per therm, making the new price 10·2d. per therm. The charge to slot meter consumers is reduced similarly.

In Newtownards the price has been reduced from 8s. to the pre-strike price—6s. 8d. per 1000 c.ft. The charge for trade purposes is reduced to 5s. per 1000 c.ft., which is 1s. less than before the coal strike.

At the March meeting of the Stockton Town Council, a reduction in the price of gas was announced—from 4s. to 3s. 8d. per 1000 c.ft. The rates in the outside areas and for power purposes were reduced proportionately.

CURRENT SALES OF GAS PRODUCTS.

The London Market for Tar, Tar Products, and Sulphate.

London, *March* 14.

There is little change in the position of pitch. The amount of business offering is not large, and ideas of value are somewhat varied. The price to-day is nominal.

Creosote maintains a firm tone at 8¾d. to 9d. per gallon, and available supplies are readily taken up.

Pure toluole is unchanged at about 2s. 4d. to 2s. 5d. per gallon. Pure benzole is about 2s. 2d. to 2s. 3d. per gallon. Solvent naphtha is quiet at about 1s. 9d. per gallon for 95/160 quality.

Tar Products in the Provinces.

March 14.

The average values for gas-works products during the week were: Gas-works tar, 66s. 3d. to 71s. 3d. Pitch, East Coast, 87s. 6d. to 92s. 6d. f.o.b. West Coast—Manchester, 85s. to 92s.; Liverpool, 87s. 6d. to 92s. 6d.; Clyde, 90s. to 92s. 6d. Benzole 90 p.ct., North, 1s. 9d. to 1s. 10d.; crude, 65 p.ct. at 120° C., 1s. 2d. to 1s. 2½d., naked at makers' works; 50-90 p.ct. naked, North, 1s. 10d. to 1s. 11d. Toluole, naked, North, 1s. 8½d. to 1s. 9½d., nominal. Coal-tar crude naphtha, in bulk, North, 8½d. to 9d. Solvent naphtha, naked, North, 1s. 4½d. to 1s. 5½d. Heavy naphtha, North, 1s. 1d. to 1s. 2d. Creosote, in bulk, North, liquid, 7½d. to 7¾d.; salty, 7½d. to 7¾d.; Scotland, 7½d. to 7¾d. Heavy oils, in bulk, North, 9d. to 9½d. Carbolic acid, 60 p.ct., 1s. 8½d. to 1s. 9½d. prompt. Naphthalene, £11 to £14; salts, 100s. to 110s., bags included. Anthracene, "A" quality, 2½d. per minimum 40 p.ct., purely nominal; "B" quality, unsaleable.

TRADE NOTES.

"Retriever" Plants.

Messrs. George Waller & Son, Ltd., of Stroud, have recently received orders for their "Retriever" pan-ash separating plants for the following works: In England—Manchester, Southport, Doncaster, and Derby. In Australia—Sydney, Adelaide, Footscray, and Brighton.

Pitman Deflector Regulators.

Messrs. G. E. Millner & Co., Ltd., of Parliament Mansions, Victoria Street, London, S.W., inform us that they have secured control of the patent rights in the Pitman deflector regulator for the automatic speed control of impulse water turbines and hydro-electric plant. They are prepared to grant general or exclusive licences in the United Kingdom, Canada, the United States of America, France, Switzerland, Italy, Spain, and Germany. Full information may also be obtained from the inventor—Mr. Percy Pitman, water turbine manufacturer, 25, Victoria Street, London, S.W. 1.

South Staffordshire Mond Gas Company.—It was reported at the 26th ordinary meeting of the Company that the amount of fuel gasified during the year 1926 was 5 p.ct. more than in the preceding year; and 2¼ p.ct. more gas was distributed than during 1925. With the amount brought forward, there was a total undivided profit of £19,616 standing to the credit of the profit and loss account. A dividend of 2s. per share was recommended on the ordinary shares.

CONTRACTS OPEN.

Painting.

The Gas Department of the Ossett Corporation are inviting tenders for the painting of two gasholders. [See advert. on p. 684.]

Meters.

The Gas Committee of the Manchester Corporation are inviting tenders for the supply of ordinary and automatic meters. [See advert. on p. 685.]

Coal.

The Directors of the Chertsey Consumers' Company, Ltd., are inviting tenders for the supply of gas coal. [See advert. on p. 685.]

Tenders are invited by the Sidmouth Urban District Council for the supply of gas coal. [See advert. on p. 685.]

Public Lighting of the City of London.

In a paper on "The Problems of Public Lighting by Electricity," by Mr. Haydn T. Harrison, given before the Institution of Electrical Engineers on Thursday, March 3, he said: "In the opinion of the author, the main streets of the City of London are one of the best examples in this country of high-class street lighting, despite the fact that the installation dates from 1911. In this case the light sources, both gas and electric, are centrally supported from span wires attached to the buildings at a height of 27 ft. 6 in.; while in the few cases where the width of the streets permitted, the lamps are on central columns at a height of 27 ft. 6 in. The spacing averages 125 ft., except in Cheapside, which is regarded as a shopping street, where it is reduced to 95 ft. The light sources originally installed—namely, long-burning flame arc lamps—are still used, and are provided with a special type of dioptric globe for increasing the candle power, which results in a minimum horizontal illumination approaching 1 foot-candle in the case of Cheapside, at a consumption of approximately 5 watts per linear foot. The author has had the opportunity of showing this installation to several experts from various parts of the world, who criticized it most favourably; and as it resulted in the saving of nearly £7000 per annum in the lighting rate, there is no doubt that it reflects great credit on those responsible for its conception." The whole of this work was carried out under the supervision of Mr. W. J. Liberty, the late Superintendent of Public Lighting for the City of London.

Tar Residuals has been registered as a private company, with a nominal capital of £120,000, in £1 shares. The objects are to carry on the business of importers and exporters of tar and pitch and coal tar and petroleum products, and dealers in material for dressing of roads, &c. The Directors are: Messrs. M. M. Williams (Managing Director of Walter H. Brown & Co.), S. A. Brashier, F. R. Tunks, W. C. Waugh (Director of Walter Waugh & Co.), F. A. Waugh, G. E. Von der Osten, A. Stanley (Managing Director Simon-Carves, Ltd.), J. H. Hughes, and A. L. Swindells.

Employees as Partners.—On March 8 nearly four hundred men and women assembled at the Corner House, Piccadilly, for the fifth annual London Co-Partners' supper—Colonel David Carnegie, of the Labour Co-Partnership Association, presiding. Mr. Tom Lewis, of the South Metropolitan Gas Company, said that after thirty-six years of co-partnership, 6650 employees of the Company out of 8600 owned £500,000 of the Company's ordinary stock. About 1170 of them owned £100 and over each. In addition to that, and excluding the salaried staff, the workers had accumulated under the co-partnership principle another £250,000. Mr. J. R. Gale, of the North Middlesex Gas Company, said his Company had been running on a co-partnership basis since 1920, and of 220 on the wage-roll 190 were co-partners in the concern.

Four Deaths through Broken Gas Main.—A gas main which was broken early last Saturday morning at Charles Street, Cobridge, Stoke-on-Trent, resulted in the whole of the occupants of one house losing their lives. They were Elizabeth Owen, 48, widow, her two daughters, Nellie Priscilla and Blanche, 21 and 17 respectively, and a woman lodger, Lavinia Johnson, 69, a widow. During the night Mrs. Owen conversed with the neighbours on either side of her house about the smell of gas, but no particular precautions were taken by any of them, nor was any investigation made as to the cause. The four were found in bed unconscious in the morning; and though for two hours doctors and police tried artificial respiration and the administration of oxygen, their efforts were unavailing. The break in the gas main was found to be immediately under the window of the room in which Mrs. Johnson was sleeping. The fracture is thought to have been caused by the subsidence of houses in the street.

The South Suburban Gas Company have contributed one hundred guineas to the Lord Mayor's fund for the relief of the victims of the mining disasters at Cwm and Bilsthorpe.

An outbreak of fire occurred at the Southport Gas-Works on March 9, due to the bursting of an oil pump joint in the building where the carburetted water gas plant is housed. The Southport fire brigade soon extinguished the fire.

The Gas Committee of the Lancaster Corporation occupied an unusual position on the budget day of the Lancaster Corporation, March 9. They were expected to contribute £1000 to the relief of the rates, but there was a deficiency of £9122. The abnormal expenditure of the coal strike period was alone responsible for the position. The income was £75,469, against £65,570 expected, but the expenditure was £84,591. They increased the price of gas from 2s. 11d. to 3s. 6d. per 1000 c.ft., and hope to wipe out the deficiency next year.

STOCK MARKET REPORT.

NOTWITHSTANDING the retarding influence of the Settlement last week, there was an appreciable increase in the business done on the Stock Exchange, and future prospects are quite hopeful. The response afforded to home Corporation issues, now that the terms provide for a clear 5 p.ct. yield, was gratifying; and for the same reason more attention was given to Colonial stocks. An item of interest is the growing tendency for Australian issues to be made in New York.

Generally there were no changes on gilt-edged descriptions, but recent scrips were most in demand. Home Rails were dull, though some appreciation took place in Districts.

Business in the Industrial Market was not on the up grade; in fact, there was a general inertness except where quotations were moved by special considerations. With the increased taxation rumours it was not surprising that Tobaccos were weak, and the Budget will be awaited with anxiety. Rubbers were an exception, and improved with the further increase in the price of the commodity.

Issue.	Share.	When ex-Dividend.	Dividends. Prev. Hf.Yr	Dividends. Last Hf. Yr.	NAME.	Quotations. Mar. 11.	Rise or Fall on Week.	Transactions. Lowest and Highest Prices.
£			%p.a.	% p.a.				
171,978	Stk.	Feb. 10	5	5	Aldershot 5 p.c. max. C.	70—73	..	72
822,992	,,	,,	4	4	Do. 4 p.c. Pref.	63—71	..	69½
1,651,868	,,	Sept. 30	6½	6½	Alliance & Dublin Ord.	81—86	..	84¼
374,000	,,	Jan. 18	4	4	Do. 4 p.c. Deb.	65—68	..	..
800,000	1	Oct. 14	1/7½	1/7½	Bombay, Ltd.	1—1¼	..	..
170,000	10	Mar. 10	8½	8½	Bournemouth 5 p.c.	12½—13½*	—¼	..
800,000	10	,,	7	7	Do. B 7 p.c.	11¾—12¾*	—¼	12¼—12¾
275,000	10	,,	6	6	Do. Pref. 6 p.c.	10¾—11¼*	—¼	..
50,000	Stk.	Jan. 13	3	3	Do. 3 p.c. Deb.	53—56	..	..
182,025	,,	,,	4	4	Do. 4 p.c. Deb.	73—76	..	..
214,740	,,	Mar. 10	12	12	Brighton & Hove Orig.	159—164*	—4	..
344,200	,,	,,	9	9	Do. A Ord.	122—127*	—3	..
1,327,500	,,	Feb. 24	5	5	Bristol 5 p.c. max.	87¼—88¼a	+2	..
855,000	,,	Sept. 30	7	8	British Ord.	107—110	..	108½—110
100,000	,,	Dec. 30	7	7	Do. 7 p.c. Pref.	119—117	..	..
150,000	,,	,,	4	4	Do. 4 p.c. Red. Deb.	75—80	..	..
100,000	10	Dec. 9	8	6	Cape Town, Ltd.	7—8	..	..
100,000	10	Oct. 28	4½	4½	Do. 4½ p.c. Pref.	6—7	..	..
150,000	Stk.	Dec. 30	4½	4½	Do. 4½ p.c. Deb.	68—73	..	..
696,860	,,	Feb. 24	6	6	Cardiff Con. Ord.	95—98	..	..
327,860	,,	Dec. 30	7½	7½	Do. 7½ p.c. Red. Deb.	100—103	..	..
157,150	,,	Feb. 24	5	6½	Chester 5 p.c. Ord.	86½—91½b	..	..
79,185	1	Sept. 30	1/2-	1/2-	Colombo Ltd. Ord.	27/—29/-	..	..
34,495	1	,,	1/4¼	1/4¼	Do. 7 p.c. Pref.	20/—22/-	..	..
921,490	1	Oct. 14	1/9½	1/7½	Colonial Gas Assn. Ld. Ord.	25/—27/-	..	26/6—26/9
173,900	1	,,	1/9½	1/7½	Do. 8 p.c. Pref.	21/—23/-	..	21/6
1,818,280	Stk.	Feb. 24	5½	5½	Commercial 4 p.c. Cap.	82—85	..	83—84½
650,000	,,	,,	5/8/4	5/8/4	Do. 3½ p.c. Cap.	80—83	..	81—83
475,000	,,	Dec. 30	3	3	Do 3 p.c. Deb.	54—57	..	56
850,000	,,	Sept. 30	§2	§1	Continental Union, Ltd.	28—33	..	29½
200,000	,,	Mar. 10	7	7	Do. 7 p.c. Pref.	79—83*	—3	..
787,560	,,	Mar. 10	6½	6½	Croydon sliding scale	96—99*	..	98—99
408,100	,,	,,	5	5	Do. max. div.	77—80*	—1	78½—81½
622,270	,,	Feb. 24	9	9	Derby Con.	106—108c	..	..
55,000	,,	Dec. 30	4	4	Do. Deb.	73—75c	..	..
980,000	,,	Mar. 10	5	5	East Hull Ord. 5 p.c.	76—80*	—2	..
50,000	,,	Dec. 30	5	5	Eastbourne 5 p.c. Deb.	90—95	..	..
1,602,180	10	Sept. 30	†4	†3	European, Ltd.	6—7	..	..
18,747,460	Stk.	Feb. 10	5/1/4	5	Gas Light & Coke 4 p.c. Ord.	86½—88½	..	87¼—88½
2,600,000	,,	,,	8½	8½	Do. 8½ p.c. max.	58—61	..	59¾—60½
4,157,020	,,	,,	4	4	Do. 4 p.c. Con. Pref.	74—77	..	76½—77¾
5,629,620	,,	Dec. 30	3	3	Do. 3 p.c. Con. Deb.	58—61	..	59½—59¾
181,315	,,	,,	—	6	Do. 6 p.c. Red. Db.	100—105	..	..
1,642,770	,,	,,	—	5	Do. 5 p.c. Red. Deb.	99—100	..	99⅛—99⅛
42,000	,,	,,	7½	7½	Do. 7½ p.c. Ilford Deb.	..	..	..
93,500	,,	Mar. 10	6½	6½	Hastings & St L. 5 p.c. Conv	88—90*	—½	..
358,740	,,	,,	5½	5½	Do. 5 p.c. Conv.	65—70*	—1	..
70,000	10	Oct. 14	†10	†10	Hongkong & China, Ltd.	12—18	..	..
173,300	Stk.	Mar. 10	5	5	Hornsey Con. 3½ p.c.	67—69*	—2	..
1,976,000	,,	Nov. 11	†10	10	Imperial Continental Cap.	133—136	..	134—136
226,170	,,	Feb. 10	3½	3½	Do. 3½ p.c. Red. Deb.	67—69	..	..
395,242	,,	Mar. 10	6½	6½	Lea Bridge 5 p.c. Ord.	92—97*	—2	..
2,145,907	,,	Feb. 24	5½	5½	Liverpool 5 p.c. Ord.	80—81b	..	80½
800,000	,,	Sept. 30	7	7	Do. 7 p.c. Red. Pref.	104—106b	..	..
185,736	,,	Feb. 24	9	8	Maidstone 5 p.c. Cap.	110—115	..	..
81,480	,,	Dec. 30	3	3	Do. 3 p.c. Deb.	52—57	..	..
75,000	5	Dec. 9	†7	†7	Malta & Mediterranean	5½—5¾	..	..
541,920	Stk.	Nov. 25	†6	†5	Montevideo, Ltd.	80—83	..	..
1,981,815	,,	Feb. 24	5	5	Newcastle & Gateshead Con.	79½—78¾d	+1½	..
980,929	,,	,,	4	4	Do. 4 p.c. Pref.	68½—67¾d	..	..
691,705	,,	Dec. 30	3½	3½	Do. 3½ p.c. Deb.	67½—67¾d	..	..
131,785	,,	—	—	—	North Middlesex 6 p.c. Con.	93—95	..	..
800,000	,,	Nov. 25	7	9	Oriental, Ltd.	97—102	..	..
188,120	,,	Dec. 30	7½	7½	Plym'th & Ston'house 5 p.c.	105—110	..	..
414,500	,,	Feb. 24	7½	7½	Portsm'th Con. Stk. 4 p.c. Std.	100—105	..	..
253,732	,,	,,	5	5	Do. 5 p.c. max.	76—79	..	..
1,969,909	1	—	—	—	Primitiva Ord.	14/—15/-	..	14/3—14/9
989,900	100	Dec. 1	4	4	Do. 4 p.c. Red. Deb.	85—87	..	..
600,000	Stk.	Jan. 27	4	4	Do. 4 p.c. Red. Deb. 1911	70—72	+1	..
434,963	,,	Dec. 30	—	4	Do. 4 p.c. Cons. Deb.	69—71	..	70§
180,000	10	Sept. 30	6	6	San Paulo 6 p.c. Pref.	7½—8	..	..
126,000	50	July 1	5	5	Do. 5 p.c. Red. Deb.	47—50	..	..
270,000	Stk.	Sept. 16	6	5½	Sheffield A	96—98s	..	..
419,968	,,	,,	6	5½	Do. B	96—98s	..	..
1,047,000	,,	,,	6	5½	Do. C	96—98s	..	..
90,000	10	June 11	4	—	South African	4—6	..	..
8,009,898	Stk.	Feb. 24	5	7	South Met. Ord.	97—99	+1	97—98½
1,896,445	,,	Jan. 13	3	3	Do. 3 p.c. Deb.	57—60	..	58½
734,000	,,	Mar. 10	6½	6½	Do. 6½ p.c. Red. Db.	99—101*	—2	..
91,500	,,	Feb. 24	8½	8½	South Shields Con.	103—1104	..	..
1,343,795	,,	Mar. 10	6½	6½	South Suburban Ord. 5 p.c.	100—103*	—2	101½—102½
366,837	,,	Dec. 30	5	5	Do. 5 p.c. Deb.	93—96	..	..
647,740	,,	Oct. 14	5	5	South'mpton Ord. 5 p.c. max.	76—79	..	..
131,375	,,	Dec. 30	4	4	Do. 4 p.c. Deb.	68—73	..	..
250,000	,,	Feb. 24	7	7	Swansea 7 p.c. Red. Pref.	100—102	..	..
300,000	,,	Dec. 30	6½	6½	Do. 6½ p.c. Red. Deb.	102—104	..	..
130,000	,,	Feb. 24	7½	7½	Tottenham District A 5 p.c.	105—110	..	..
883,376	,,	,,	6½	6½	Do. B 3½ p.c.	89—92	..	90½—91½
180,000	,,	,,	5½	5½	Do. 5½ p.c. Pref.	97—100	..	..
191,358	,,	Dec. 9	4	4	Do. 4 p.c. Deb.	72—75	..	..
986,381	,,	Aug. 26	5	5	Tynemouth Con. and New Uxbridge, Maidenhead, &	69½—70½d	..	..
197,294	,,	Mar. 10	6½	6½	Wycombe 5 p.c.	85—90*	—2	..
98,380	,,	,,	5	5	Do. 5 p.c. pref.	83—88*	..	85
91,900	,,	,,	6½	6½	Do. 5 p.c. Maidenh'd	83—88*	—2	..
90,000	,,	Mar. 10	8½	8½	Wandsworth, Wimbledon, and Epsom— Wandsworth A 5 p.c.	119—124*	—3	..
265,626	,,	,,	7	7	Do. B 5½ p.c.	99—104*	—3	100½
493,595	,,	,,	5/19/0	5/19/0	Do. C and New	87—92*	—1	88½
893,000	,,	,,	6§	6§	Wimbledon 5 p.c.	95—100*	—3	..
98,000	,,	,,	7½	7½	Epsom 5 p.c.	101—106*	—3	..
88,416	,,	Dec. 30	3	3	3 p.c. Deb.	54—57	..	55

Quotations at:—a.—Bristol. b.—Liverpool. c.—Nottingham. d.—Newcastle. s.—Sheffield. *Ex. div. † Paid free of income-tax. ‡ Plus 8½ p.ct. p.a. special dividend. § For year.

It will be seen by the Table that there were numerous gas stocks marked down for *ex* dividend. Otherwise the only variations were a rise of 2 points in Bristol 5 p.ct. maximum, Newcastle and Gateshead 1½ points, and South Metropolitan 1 point. It will also be noticed that the North Middlesex 10 p.ct. and 7 p.ct. stocks, consolidated under the recent Board of Trade Order with a standard dividend of 6 p.ct., appear for the first time. The stock is an attractive investment, but is difficult to obtain.

The following transactions were recorded during the week:

On Monday, Bournemouth "B" 12⅛, 12¾, British 109, Colonial 8 p.ct. preference 21s. 6d., Commercial 4 p.ct. 83, 84, 3½ p.ct. 81, 3 p.ct. debenture 56, Gas Light and Coke 87¼, 87⅛, 87⅜, 88, 88⅛, 3½ p.ct. maximum 59½, 60¼, 60½, 4 p.ct. preference 76¼, 76½, 3 p.ct. debenture 59½, Imperial Continental 134½, Primitiva 14s. 3d., 14s. 4½d., 14s. 6d., 14s. 7½d., South Metropolitan 97, 97⅛, 97⅜, 97½, 98, 98⅛, 3 p.ct. debenture 58¾.

On Tuesday, Aldershot 72, Alliance and Dublin 84¼, British 108½, Colonial 26s. 6d., 26s. 9d., Continental Union 29½, Croydon sliding-scale 99, maximum dividend 80½, 81½, Gas Light and Coke 87⅛, 87½, 87¾, 88, 4 p.ct. preference 77, 3 p.ct. debenture 59½, Imperial Continental 134½, Primitiva 14s. 4½d., 14s. 6d., South Metropolitan 98¾, Tottenham "B" 90½, 91. Supplementary prices, Watford "A" 97¾, 98¼.

On Wednesday, Croydon sliding-scale 98, maximum dividend 80½, 81½, Gas Light and Coke 87¼, 87½, 3½ p.ct. maximum 59¾, 4 p.ct. preference 76¼, 3 p.ct. debenture 59¼, 59½, Imperial Continental 134, 134½, 136, Primitiva 14s. 4½d., 4 p.ct. debenture 70¾, South Metropolitan 98, 98½, Tottenham "B" 91. Supplementary prices, Brighton and Hove 4 p.ct. debenture 74, 7 p.ct. debenture 104½, Croydon 7½ p.ct. preference 103, 103½, 7 p.ct. debenture 103, Liverpool 5 p.ct. 80¼. Montevideo 6 p.ct. debenture 96½.

On Thursday, Aldershot 4 p.ct. preference 59½, Bournemouth "B" 12½ *ex* div., Commercial 3½ p.ct. 82, 83, Gas Light and Coke 87½, 88, 3 p.ct. debenture 59½, 5 p.ct. debenture 99¼, Imperial Continental 134½, Primitiva 14s. 3d., 14s. 6d., 14s. 7½d., 14s. 9d., South Metropolitan 98½, South Suburban 5 p.ct. 101½ *ex* div. Supplementary prices, Barnet 4 p.ct. debenture 72¾, 73½.

On Friday, British 110, Commercial 4 p.ct. 83½, 84½, 3½ p.ct. 83, Croydon maximum dividend 78½, 79½, Gas Light and Coke 87½, 87⅝, 88, 4 p.ct. preference 77½, 5 p.ct. debenture 99¼, 99⅞, 99⅛, Imperial Continental 134, 135½, Primitiva 14s. 4½d., 14s. 6d., 14s. 6¾d., 14s. 7½d., South Metropolitan 97⅞, 98½, 98⅝, South Suburban 5 p.ct. 102½, Tottenham "B" 91½, Uxbridge 5 p.ct. preference 85, Wandsworth "B" 100½, "C" 88½, 3 p.ct. debenture 55. Supplementary prices, Pinner 6 p.ct. preference 5⅛.

The monetary conditions in Lombard Street were more stringent. Discounts were firmer, but there was little change in the average rate at which Treasury Bills were allotted. This rate—£4 7s. 2·11d. p.ct.—was 3½d. p.ct. below that for the previous week. Four p.ct. was the usual charge for renewal of old loans, but new money was obtainable towards the close at 3½ p.ct.

In the Foreign Exchange Market the only interest was centred in Spanish pesetas, in which there were active dealings. Buyers predominated, and the Madrid rate fell to about 28.14. The exchange reacted, however, and the final quotation was 28.09. The New York rate was steady at 4.85½; the Paris cheque was quoted at 124; Italian lire concluded at 108.90; and Belgas were firm at 34.90.

Silver recovered on Indian buying to 25½d. per oz. Gold was sold at 84s. 10½d. per oz.—a decline of ¾d. per oz.

The Bank Rate is 5 p.ct., to which it was raised from 4 p.ct. on Dec. 3, 1925. Bankers' deposit rates are 3 p.ct. The deposit rates of the discount houses are 3 p.ct. at call and 3¼ p.ct. at notice.

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See "JOURNAL," March 9, p. 618.

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APPOINTMENT OF GAS MANAGER.

THE above Council invite Applications for the Post of MANAGER of their Gas Undertaking at a Salary of £500 per Annum.
A Form of Application may be obtained from the undersigned.
Candidates must devote the whole of their time to the Duties of the office, and must reside in the Urban District of Ellesmere Port and Whitby.
Applications, endorsed "Gas Manager," and accompanied by a *copy* of not more than Three recent Testimonials, must reach the undersigned not later than the 2nd of April, 1927.
THOS. W. FRANCIS,
Clerk to the Council.
Council Offices,
Ellesmere Port,
March 14, 1927.

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ARNOLD E. MOTTRAM,
Engineer and Manager.

CONTENTS.

EDITORIAL NOTES.

Industrialists' Fuel Outlook 713
Assisted Electric Wiring and the Maintenance of Gas Appliances 714
The Coke-Oven Gas Tributary 714
Gas Legislation—Electricity on the Therm Basis—Coal Stoppage and Belgian Gas Supply—Coal Imports during February—Regaining Markets—Coal Output . . . 715
Mr. Cook in the Corner—Tide of Employment 716

"B.E.S.A." Draft Street Lighting Specification 716
Personal 717
Obituary 717
Forthcoming Engagements 717
Electricity Supply Memoranda 717
Inauguration of New Plant at Blackburn—Carburetted Water Gas Plant and Additional Storage 719
Smoke Abatement Exhibition 723
More Views from Olympia 724
"B.C.G.A." District Conference at Smethwick—
Luncheon 725
Industrial Heating by Town Gas: Its Advantages and its Relation to the Conservation of Fuel. By C. M. Walter, D.Sc. 726
Dry Cleaning of Coal. By R. Bulmer . . 730
Yorkshire and Manchester Juniors at Elland—A Successful Joint Meeting 732
The Belgian Gas Industry 736
Proposed National Fuel Research Board or Council in America 736
Utilization of Gas Coke. By E. W. Smith, D.Sc., F.I.C. 737
Board of Trade Gas Undertakings Return for 1925. Part II.—Finance and Prices . . 743
Notes on New Books 744
Lead for Chemical Plant—A Criticism of the "B.E.S.A." 745
As Others See Us 745

Midland Junior Gas Association—
Vacuum Control in the Retort House by Automatic Regulators. By A. St. Dunstan Corder 746
Wales and Monmouthshire Junior Gas Association—
Notes on Distribution. By T. V. Blake . 749
Gas-Works Practice 751
Manchester and District Junior Gas Association—Visit to the Blackburn Gas-Works . 752
Atmospheric Pollution 752

REGISTER OF PATENTS.

Suspended Lamps—Evered & Co., Ltd., and Barnes, F. V. 752
Gas Ovens—Ruth, H. W. 752
Gas Burners—Frankfurter Gasgesellschaft and Schumacher, E. 752
Low-Temperature Carbonization—Meiro, A. 752
Applications for Patents 752

PARLIAMENTARY INTELLIGENCE.

House of Lords—
Progress of Bills 753
Special Orders 753
Hastings Electricity (Extension) Special Order, 1927 753
House of Commons—
Progress of Bills 753
The Matlocks Urban District Council Bill 753
Leeds Corporation Bill 754

LEGAL INTELLIGENCE.

Workmen's Compensation Act Claim—Commercial Gas Company's Application . . 755
Mr. George Helps' Bankruptcy—Public Examination 755
Gas Company's Application to Supply Electricity 755

MISCELLANEOUS NEWS.

Sheffield Gas Company—Coke Oven Gas for Town Supplies 756
Reductions in the Price of Gas 756
Manchester Meter Testing Station—Visit by Chairmen of Gas Undertakings 756
Gas Companies' Results for 1926 757
Metropolitan Gas Company of Melbourne . 758
Trade Notes 758
Contracts Open 758
Australian Gas Light Company 759
Coal Trade Reports—
North-East Coast 759
Yorkshire and Lancashire 759
Midlands 759
Current Sales of Gas Products 760
Stock Market Report 761

PARAGRAPHS.

Gas for Varnish Making 724
Canadian Gas Association—Wales and Monmouthshire District Institution — Books Received—Cardiff Technical College . . 731
Lyme Regis Electricity Figures — Research and the Metal Industries 755
Leatherhead Preference Stock Tenders . . 756
Glasgow Coke Oven Gas Supply 759
Chichester Gas Company's Capital Issue—Colonial Gas Association Dividend—Smoke Abatement Conference—Power Efficiency Exhibition—Radiation Ltd.—Maryborough (Queensland) Gas Company—Imperial Continental Gas Association Dividend—Auckland (N.Z.) Gas Company — Gibbons (Dudley), Ltd.—Thanks and Congratulations at Bradford 760

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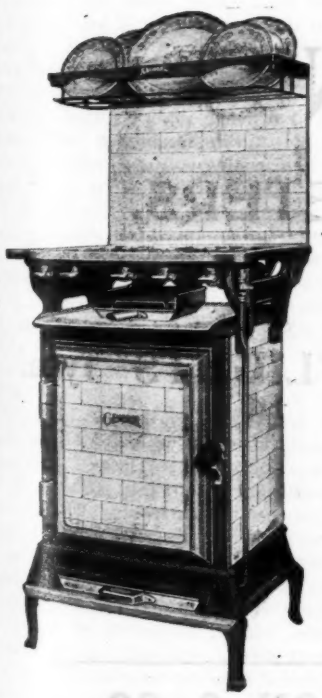

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